

The Iron Age

A Review of the Hardware, Iron and Metal Trades.

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The Duplex Safety Boiler.

The growing favor with which tubular boilers are received by those employing power, is due to advantages which have become generally recognized and to improvements in their construction, in consequence of which inconveniences in their use have been removed. It is conceded that, so far as safety is concerned, experience has proved them to be far in advance of older types, but to secure safety, economy and durability were often sacrificed. These essentials are not, however, incompatible with safety. Among the more recent designs of tubular boilers is that by the Duplex Safety Boiler Company, of this city, which has been brought to its present shape, shown in the accompanying illustration, after a series of improvements extending over the past few years. The boiler is composed of vertical sections, suspended from a horizontal drum, the number of the sections depending upon the size of the boiler. Each consists of a cluster of eight tubes surrounding one central one, each one of the outer tubes having within it a 2-inch tube, which extends through the upper and lower chamber. The upper and lower ends are held by gun metal chambers shown in the engraving. A large body of water is thus exposed to the fire in the thin sheets, which it occupies between the inner and outer tubes of the eight tubes of each section. All of the tubes are extended into the chambers, a recess being accurately bored and reamed for its reception. The central tube, with an area greater than the aggregate area of the tubes around it, has no interior tube. Each section is suspended from the drum by a branch, and can be readily removed for repairs. The drum is small in diameter, and as it must be strong to support the weight of the sections filled with water, it is made of the best charcoal hammered iron, of ample thickness, and is thoroughly braced, so that it will resist pressures much higher than it is subjected to in use.

The boiler thus formed of the drum and sections is set in brickwork in the ordinary way, the furnace proper, which is sometimes provided with the Rogers shaking grate, having one compartment which forms a combustion chamber. It incloses the principal portion of the sections. For the purpose of utilizing the waste heat of the escaping gases, one or more sections are placed back of the bridge wall. The hot gases pass around the drum also. The circulating pipe shown connects the lower portions of the sections, and through it the feed water is introduced and the boiler blown off.

In the operation of the boiler, the fire surrounds the tubes and chambers of the sections, and also passes up through the inner tubes. The water contained within the sections, being divided into thin sheets, is practically in the fire, divided from it only by a thin plate of iron. Steam is generated rapidly and rises in the upper cluster of tubes to the upper chamber, carrying water with it. At the connection of the section with the drum, the steam rises into the latter, while the water passes downward through the central tube to the bottom chamber. A very rapid circulation is thus secured, with all the advantages it offers in the rapid and economical generation of steam and in the prevention of the formation of scale. We are informed that a number of large establishments have adopted the Duplex boiler, and that tests made by consumers have given very good results.

The method of raising water by centrifugal pumps is well known, in which a rotary motion is imparted to a system of pallets in a stationary cylinder. M. De Romilly, in a recent note to the French Academy, describes a different system giving very good effects. In it a shallow cylinder without pallets is rotated, and the water, forced toward its periphery, is received into a vertical pipe passing through a wide opening in the top of the cylinder, and bending outward and round, so that its mouth is near the outer wall of the cylinder and faces the whirling liquid. The water rises to a height proportional to the square of the velocity. A laboratory apparatus of this type, driven by hand, raised water to a height of 150 meters. Where the turbine is placed above the source of water, the receiving tube is bent downward to the latter, and enters with horizontal point the conical end of another pipe, which extends upward to the reservoir. It is important to have lubrication corresponding in efficiency to the speed, players in sending in the returns, had been

and for this purpose two smaller turbines, acting in a similar way with oil, are worked on the axis.

Employers' Liability for Injury to Workmen.

At the recent meeting of the Iron Trades' Employers' Association, of Great Britain, a report was read which dealt with the questions raised by the passage of the employers' liability act, and the best means for protecting members of the association from claims made by workmen under its provisions. A committee has gathered information as to the number of fatal and minor accidents, to show the risks in different departments of the iron trade:

Returns have been received from employers of 30,000 workmen, and taking all the different departments of the engineering, shipbuilding, iron founding, and machine-making trades it was found that of 88,200 men who have been under risk in these several trades, during the three years, 39 have met with fatal accidents, and 2002 have with minor accidents, which included every accident reported, being all risks without

their only guide, but a careful consideration of the remarks given in the schedules showed plainly that by far the largest proportion of the accidents could not be traced to the negligence of the employers, but that in fact it might be safely assumed that fully 75 per cent. might be attributed to the carelessness of the workmen; and so far as the minor accidents were concerned, they appeared to be singularly slight. After prolonged and very minute investigation of the facts before them, the committee concluded that it was desirable to base the proposed rate of premiums for insurance upon the amount paid annually as wages, rather than upon the fluctuating numbers of men and boys employed at any given time. They had also re-adjusted their classifications, and had placed marine engineers among the general engineering divisions of the iron trade, shipbuilders and machinists, thus forming distinct divisions. The terms upon which the committee had concluded to issue policy of insurance were as follows: Machinists, 2/ per cent.; engineers generally, founders, millwrights, tool makers, locomotive makers, marine engineers, boiler makers, &c., 3/ per cent.; and shipbuilders, 4/ per cent. The proposal is experimental, but it has

safe as could be demanded by any system of inspection. They were the more anxious to take this step from the fact that, in the course of a business which has covered over 20 years, only two boilers from their workshops have exploded. Accordingly, they set about the construction of a boiler the counterpart in every respect, save that of length, of the one which created such havoc in Kensington, for the purpose of subjecting it to the hydrostatic test until it burst, the intention being to ascertain how much pressure would be required to break a flat cast-iron head. The boiler, which was completed a few days ago, was 36 inches in diameter, 42 inches in length, and constructed of a substantial iron known in the trade as No. 3 Birmingham wire gauge. The door of the man-hole was the same which did a similar service in the Gaffney boiler.

Four o'clock yesterday was the hour fixed for the test. Invitations had been sent to the members of the jury which had pronounced against these heads, and to the Commission on Steam Boilers appointed by Mayor Stokley. At the time appointed five out of the six jurors (Messrs. J. B. Fontaine, of the firm of Fontaine, Abbott & Co., machinists; J. Shields Wilson, superintendent of Neafie & Levy's Penn Boiler Works;

gradually increased to 425 pounds, and the lookers-on were beginning to wonder whether the boiler would hold out forever, when a sudden crack was heard in the front head and the water commenced to run down from a fissure extending half-way across the head. The gauge showed that the boiler had given out at a pressure of 450 pounds, and a subsequent examination showed that the break had commenced at the leaky sand hole before mentioned. Had it not been for this defect the head would probably have stood an additional 50 pounds pressure before giving way. The measurement taken by Inspector Overn showed that the rear head had expanded 1-16th of an inch at 200 pounds, and 3-16th at the time of the break. The members of the Coroner's jury had little to say concerning the result. Three of the five sat some distance away while the pressure was being applied, and apparently took but little interest in the proceedings. Before leaving they held a short confidential consultation, in the course of which one remarked: "This is no reflection on us. If we undertake to answer it we shall never be done with the subject." "Yes," responded another, "we would start a discussion which would never end." Several of the journeymen, when asked to give their opinion of the experiment, emphatically declined to express themselves on the subject.

Several weeks ago, when the Hartford Company decided not to pass any boilers with flat cast-iron heads over 32 inches in diameter, City Inspector Overn addressed a communication to City Solicitor West, asking what authority, if any, the City Inspector could exercise in the same direction, and also requesting advice as to how he should govern himself in passing upon such boilers. In reply, the City Solicitor says that the questions are more fitted for a mechanical expert than for a lawyer, but that legally he would advise the inspector, when in his judgment a boiler is safe, to approve it and give a certificate, without regard to its mode of construction or the material used. Mr. Overn has consequently decided to adhere to his usual practice of passing all boilers with the obnoxious heads if they have safely withstood the cold water test.

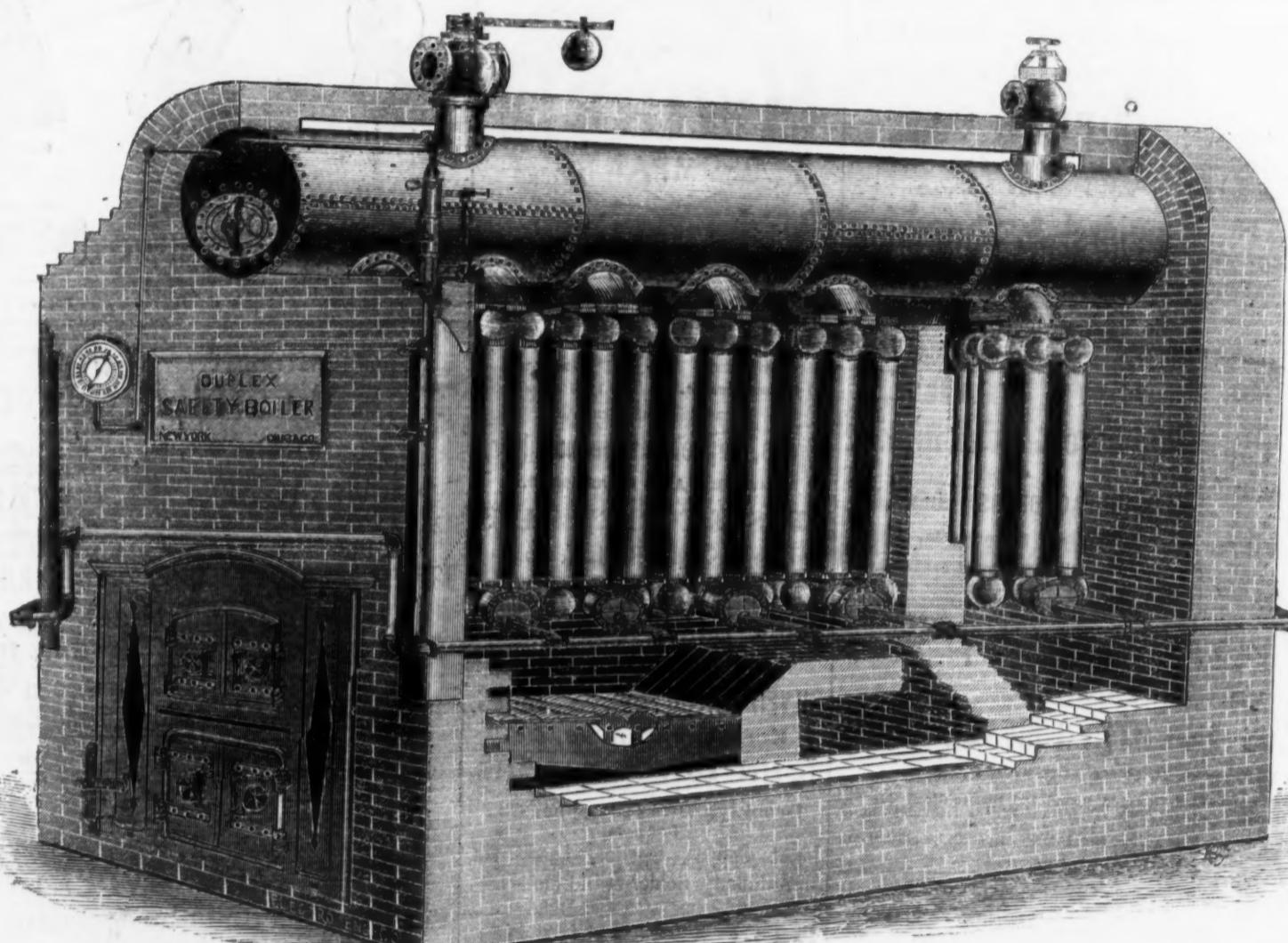
Gen. J. B. Frisbie, lately from Mexico, where he has resided for several years, is now in New York city. He is non-committal in regard to the probability that the government will be able to pay its promised subsidies to railroad corporations, but repeats the remark made to him by the President of the Republic, a short time ago, that no more subsidies would be granted. He anticipates a gradual growth and development of the country under the stimulus of American enterprise, and that the revenues will be proportionately increased. In the almost total absence of modern machinery, all kinds of industries in a very backward state, despite natural advantages which Mexico possesses. Mexico has capital, but do not know

how to use it, having neither banks nor corporations. Englishmen own the only bank, and Germans control the foreign trade. Skilled labor is scarce and commands good pay; machinists, for instance, receiving \$175 per month. The two railroads now building—National and Mexican Central—have about 20,000 men at work on them, and are destined to effect great changes, not only in putting some of the richest sections of the country in communication with the seaboard, but making it practicable to transport products, merchandise, machinery, &c., hitherto and thither as desired, relieving the mule of its ancient burdens.

When everything was in readiness the pressure was applied. The usual sapping at the rivets was apparent when the gauge registered 105 pounds, but beyond this the boiler did not exhibit any symptoms of a strain. At 120 pounds the water began to ooze through a small sandhole in the head, above the man-hole, showing that the head was slightly defective. The pressure was then reduced, while Inspector Overn affixed a contrivance to the rear end for the purpose of measuring the extent of expansion. Pressure was again applied until the gauge marked 140 pounds, then 160, 180 and 200. At this amount of pressure the seams on the side of the boiler began to weaken, and from one spot a spray of water as fine as steam was discharged. At 250 pounds this had increased to a good-sized squirt, and at 350 the water was issuing with such force as to be thrown 4 feet away. Still the heads remained intact. At 400 pounds half a dozen similar fissures appeared in a close row in the same seam. The pressure was then

Judge George W. McCrary, of the United States Circuit Court at Little Rock, Ark., has just rendered a decision in the suit brought by the Southern Express Company to restrain the Iron Mountain Railroad from charging the complainants higher rates on express matter than it charges for similar express matter received from or delivered to itself or the Pacific Express Company, and also from discriminating against the plaintiff in favor of itself or any other express company or person in the matter of rates. A temporary injunction was granted, which the respondent prayed should be dissolved. The motion was refused.

A steamer arrived recently in the Thames from the Clyde which is steered from an electric apparatus. The steering gear worked well, but the compasses were so affected by the electricity as to be useless.



THE DUPLEX SAFETY BOILER.

classification, the fatal accidents are as 1 for every 2263 men and boys employed, and the minor accidents of all kinds are as 1 for every 44 men and boys employed over the period named. A closer examination into the details of the returns, however, brought out the fact that the ratio of risks is very variable, and by a classification of the facts nearly every section of the engineering and machine-making trades gave interesting data in this respect. Eventually it was determined to classify the respective industries in the following order: Class A, machinists and light industries in the textile machine trade; class B, engineers, tool makers, locomotive builders, boiler makers, founders, millwrights, &c.; class C, ship-builders and marine engineers. In class A the returns show 1 fatal accident to every 10,525 men, and 1 minor accident to every 64 men employed, these figures being based entirely upon returns from manufacturers of cotton, woolen, and lace-making machinery. In class B the tables show that there was 1 fatal accident to every 293 men, and 1 minor accident to every 67 men employed, this division taking in all the leading sections of the engineering trades. In class C it was found that there was a fatal accident to every 1185 men, and 1 minor accident to every 26 men employed. These returns having been obtained, the only difficulty to be dealt with, and to which only an approximate solution could at present be found, was what proportion of the accidents might fall under the provisions of the employers' liability act. In this respect the supplemental information, given by the employers in sending in the returns, had been

been indorsed by professional authority and declared to be a sound one. The terms which have been offered by insurance companies who have solicited the business of the association have been in the first instance so exorbitant as to altogether preclude their consideration, and, in an appendix to the report, it is pointed out that the total premiums required by companies in Manchester and London are 328 and 337 per cent. in advance of the committee's quotations.

Rupturing a Boiler by Hydrostatic Pressure.

An interesting experiment was made at Frankford, near Philadelphia, on the 13th inst., the object of which was to refute the conclusions of the coroner's jury in their verdict on the recent explosion of Gaffney & Dolan's boiler. The Philadelphia *Record* of the 14th inst. says:

The firm in question, Messrs. Sidebotham & Powell, were the builders of the boiler which exploded, with such disastrous results, at the dye works of Gaffney & Co., in Kensington, in the early part of June. The boiler had been placed in position, new from the workshop, less than a month before, and had been passed as perfect in every particular by the inspectors of the Hartford Company. The jury, however, ascribed the explosion to the improper use of cast iron in the flat head of the boiler, and the inspectors who certified to its safety were severely censured. The builders, instead of airing their opinions in print, determined to demonstrate that cast iron flat heads were as

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Papers on Practical Founding—XXX.

BY EDWARD KIRK.

CASTING.

Under this head I shall not attempt to describe the mode of melting the iron, for I have already described that part of the business at length in my work entitled the "Founding of Metals." I shall here only describe the process of filling the molds with molten iron after it has been melted. The work of casting or filling the molds with molten iron to form the castings is as important a matter as either the melting of the iron or the making of the molds, for it does not matter how hot and fluid the iron is, or how perfect the molds are made, perfect castings cannot be made unless the molten iron is properly poured into the molds. The usual time of casting in stove foundries is from 2 to 5 o'clock in the afternoon. This time is considered preferable to all others, because the work of casting always heats up the foundry and molding sand so that it becomes very hot and disagreeable work making any molds after the work of casting has been begun. The work of molding generally stops as soon as it is time to begin casting, and the later in the day the casting begins the more time the molders have for molding and the more molds they have to cast. For these reasons the work of casting is always put off until the latest hour that will give the molders time to get through casting, and get their castings all taken out of the sand and the sand wet and shoveled up before quitting time. In all large stove foundries each molder is provided with a ladle and shank for pouring off his molds. The molders are divided up into casting sections, with from 10 to 30 or 40 men in a section, according to the capacity of the cupola. When casting, only one section is allowed to catch or pour at a time. This is done to avoid crowding and confusion around the cupola, and also to enable each molder to pour off all his molds without delay when he starts, so that he can have a red-hot ladle every cast after the first one, and thus avoid chilling the iron by catching in a cold ladle. When pouring, each section comes up in its turn, and as fast as one gets done another comes up, and so on until all the molds are poured off. As the section that pours off first generally gets a little the best iron and is the first to get its castings out and go home, the sections are changed every day, so that the section that is first one day last the next day, and every molder has an equal chance to get the best iron or get through with his work first and go home. In most stove foundries the time for putting the blast upon the cupola is from two to three o'clock p. m., and the time required for casting is from one to three or four hours, according to the size of the foundry or capacity of the cupola. After the blast has been on for 10 or 15 minutes the iron begins to melt, and the molten iron commences to run out at the tap hole, which is generally left open until the iron begins to melt and about a ladleful has run out. This is done in order to dry and warm up the spout and breast. The tap hole is then stopped with a bosh, and a few ladles of molten iron are allowed to accumulate in the cupola to dry up the sand bottom and breast. This iron is then tapped out and caught in hand ladles, and is poured from one ladle to another to warm them, and after all the ladles have been warmed with the iron it is poured into some heavy casting, provided it is not too dull. If it is too dull to run a casting, it is poured into the pig bed. Enough molten iron is then allowed to accumulate in the cupola to give each molder in the first section a ladleful. The cupola is then tapped and the molten iron allowed to run out, and as it flows from the cupola it is caught in the ladles by the molders, and when each molder catches in he puts his ladle under the stream over the full ladle with a quick motion, that scarcely spills a drop of iron; the full ladle is then taken away and the ladle that is filling is set down, so as to give the next molder a chance to catch in over it when full. Each molder catches in this way, and carries his ladle off to his floor as soon as it is filled. This continues until the entire section has caught or the molten iron is all out of the cupola. The cupola is then shut up with a bosh until the section have emptied their ladles and more molten iron has accumulated in the bottom of the cupola, when it is again tapped and the section given another ladleful all round, and this way of tapping and stopping is continued with each section until all the molds in the foundry are poured off. When carrying the molten iron from the cupola to the molds in hand ladles, the molder always carries his ladle to one side and behind him so as to avoid the heat of the molten iron upon his face and eyes, and also to make less risk of getting burned in case any of the molten iron is spilled while carrying it to the molds. As soon as a molder gets to the head of his floor he sets his ladle down, and takes the skimmer and skims off all the dirt and scurf that has risen to the surface of the molten iron. It is then ready for pouring and is carried to the mold into which it is to be poured. When about to pour the iron into a gate the lip of the ladle is held a little to one side of the gate, so that when tipped it will throw the stream of molten iron from the ladle directly into the gate, and if the gate is a flat one the stream is always made to strike upon the side of the gate next the ladle, so as to break the fall of the iron and make less risk of breaking down the sharp points of sand at the bottom of the gate; but if the gate is a round one the stream is generally thrown directly into it, for in this case the heel of the spew breaks the fall, and the more directly the molten iron is poured into a round gate the less risk there is of not running the casting. When about to pour a mold, the molder rests the side of the shank against his leg, so as to hold the ladle perfectly steady while pouring. He then tips the ladle with the hand on the end of the shank, so as to pour a heavy or light stream of metal from the ladle, to suit the gate and the mold that is being poured. When first starting to pour a gate, the stream from the ladle is always started light, and is increased after the gate

has been partly filled, and a steady stream that will keep the gate full is then poured from the ladle until there is enough metal in the gate to fill the mold. The pouring is then stopped to avoid wasting the iron and straining the mold, and as fast as one gate is poured the molder moves on to the next one and repeats the same operation until the ladle is emptied, or so near empty that there is not enough iron in it to fill another mold. The molder then returns to the cupola for another ladleful of iron. If the iron is very hot and fluid, any little drops of iron that are left in the ladle after pouring are kept in it; but if the iron, as it comes from the cupola, is a little dull, the little drops left in the ladle after pouring are always thrown in the pig bed. None but the hottest and most fluid of molten iron can be used for pouring light stove plates. All the small or heavy pieces are poured with one ladle, and pieces that are so light or are of such a shape that the molten iron cannot be poured into the mold through one gate fast enough to fill the mold and form the casting before the molten iron is robbed of its fluidity by the cold, damp sand, are always arranged with two or more gates and are poured from two or more ladles at the same time. When pouring any piece that requires more than one ladle to pour it, it is very important that all the ladles should be started to pour at the same time and all stopped at the same time, for if one ladle is started to pour before the others are, it may shoot the molten iron into a part of the mold that it cannot fill, and will interfere with the iron flowing properly from the other gates to fill the mold. In many cases where four ladles are used for pouring one mold, if one ladle is started to pour a few seconds before the others it will spoil the casting, and if one ladle is stopped from pouring before there is enough iron in the gates to fill the mold, it will generally spoil the casting, for there will be no pressure of iron in the gate to keep up the flow of the iron in the mold. The instant that molten iron ceases to flow in a mold, the damp sand chills it so that the mold cannot be filled from that gate or any of the other three gates. In pouring a mold with one or more gates, the most important point is to start pouring slowly, so as not to break down the gates, and to give the molten iron a chance to start to flow from the gate. The next important point is to pour a steady and continuous stream, that will keep the gate full and keep up an even and uninterrupted flow of the iron from the gate to all parts of the mold, from the time the pouring is commenced until the mold is filled. Another important point is to stop pouring at the proper time, so as to run the casting and not strain the mold. These three points constitute all the important principles of pouring stove plate, and to learn them properly requires long practical experience.

After the molds have been poured and the molten iron has had time to set, the next thing in order is to take out the castings, and as soon as the molder finishes pouring, or, if he has time between ladles, he knocks the clamps off the flasks that are poured and lays them upon the top of the flask. He begins at one end of his floor and lays the clamps of the first flask upon the floor. He then shakes the sand and casting out of the flask and sets it on end or lays it down near the clamps. The bottom board is then turned up so as to turn the sand and casting into a heap, and the bottom board is laid on the flask or set on end in front of it. The loose sand is then shoveled from the floor into the heap, and the clamps are taken from the next flask and laid on top of the flask that has been shaken out. The next flask is then shaken out and the bottom board turned up the same as with the first flask, and so on until all the flasks have been shaken out and piled or set up out of the way and the sand shoveled up from the floor. The molder then takes his hammer and pincers and lifts each piece of casting from the sand and raps it lightly with the hammer to jar the loose sand from it. The casting is then laid down on the floor or upon the side of the sand heap to cool while the other castings are being lifted from the sand and rapped. After all have been lifted from the sand heap and had the loose sand rapped from them, they are carried to the end of the floor nearest the gangway, where the gates are broken off each casting. Any little fins that may have been formed upon the edges of the castings at the parting line by the straining of the mold are all trimmed off with the hammer. The castings are then piled up on the end of the floor or in the gangway. This ends the molder's work with them. They are next taken in charge by the casting wheelers, who wheel them into the cleaning room to be cleaned, and wheel all the gates and scrap to the rattle barrels or upon the cupola scaffold to be remelted next heat. The gangway cleaners clean up all the parting sand and dirt from the castings and get the gangways ready for the next heat.

Cement for Labels.—1. Macerate 5 parts of glue in 18 parts of water. Boil and add 9 parts rock candy and 5 parts gum arabic. 2. Mix dextine with water and add a drop or two of glycerine. 3. A mixture of 1 part of dry chloride of calcium, or 2 parts of the same salt in the crystallized form, and 36 parts of gum arabic, dissolved in water to a proper consistency, forms a mucilage which holds well, does not crack by drying, and yet does not attract sufficient moisture from the air to become wet in damp weather. 4. For attaching labels to tin and other bright metallic surfaces, first rub the surface with a mixture of muriatic acid and alcohol; then apply the label with a very thin coating of the paste, and it will adhere almost as well as on glass. 5. To make cement for attaching labels to metals, take 10 parts tragacanth mucilage, 10 parts of honey and 1 part flour. The flour appears to hasten the drying and renders it less susceptible to damp. Another cement that will resist the damp still better, but will not adhere if the surface is greasy, is made by boiling together 2 parts shellac, 1 part borax and 16 parts water. Flour paste, to which a certain proportion of nitric acid has been added, and heat applied, makes a lasting cement, but the acid often acts upon the metals. The acid converts the starch into dextine.

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The tunnel proposed to be constructed between the English and French coasts cannot be said to have attracted much public attention as yet, but statements recently made, would seem to show that the project is not unlikely to be pushed forward. Whether it will ever be completed and used as a highway between this country and the Continent is somewhat open to doubt, yet it is not to be denied that the scheme is in the hands of men who know what they are about. Sir Edward Watkin, chairman of the Southeastern Railway Company, and many other railway and other undertakings—a sort of Commodore Vanderbilt in fact, but minus the Commodore's great wealth—appears to be boss of the idea, and seems to have fixed his gaze upon some definite object. It may be, perhaps, that Sir Edward is merely trying this business to force the hands of some of the other Southern lines in respect of certain routes to the Continent which run the Southeastern rather closely, but so far as can at present be ascertained he is honestly and sincerely determined to make the tunnel. At a private meeting the other day Sir Edward unbosomed himself to a patient audience to the following effect on this subject:

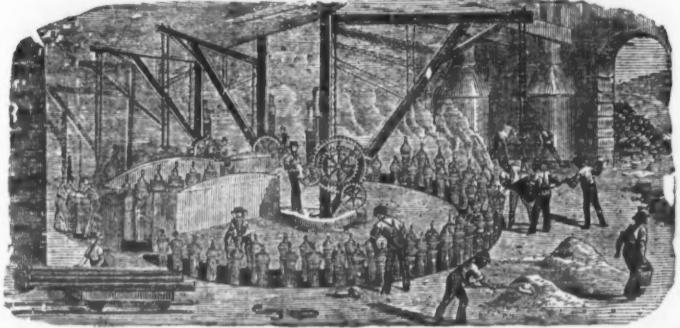
"The whole question divided itself into two parts. One was whether they could pass under the channel through a stratum which was impervious to water. The second point was whether, by the aid of machinery, they could shorten very considerably the probable time of construction. What they had done was this: They had sunk two shafts on this side of the channel—one at the Abbott's Cliff Tunnel and the other on this side of the Shakespeare Cliff Tunnel. From the first of these shafts they had driven a gallery of from 800 to 900 yards, of a diameter of 7 feet, which had all been excavated by machinery. Last week, with that machinery, which was not perfect, they excavated 67 yards of lineal distance on the extension of that gallery. If that were the maximum speed each week, it meant about two miles of progress a year. Of course, as they worked from two ends, and as the distance was only 20 miles, practically speaking, it meant five years to complete a gallery 7 feet in diameter, as an experiment, under the whole length of the channel. As to the second shaft, at the Shakespeare Cliff, they had sunk that down to a depth of 155 feet. They had also bored from the bottom of the shaft to a further depth of 106 feet. They had found no trace whatever of water in the old gray chalk. There was a small quantity of water near the surface, but this was always expected. He therefore thought that solved the great question of speed at which they could go and of the impermeability of the strata to leakages of water. On the other side of the channel the French company had sunk two very important shafts, and they had found exactly the same results as had been ascertained on this side. As to the machinery, they were on the eve of concluding another arrangement with Captain English, Colonel Beaumont, and M. Piquet, the proprietors of the machine with which they had been working. Under this new arrangement they would pay merely for the use of the machine, and by means of it they would carry those experiments considerably further (applause). It had been arranged between the French and English committees that they should drive through a heading of a further length of one mile on each side. When these two miles were finished—and they certainly ought to be in six months—one-tenth of the question was dealt with. If that were successful he should, he thought, propose a further treaty with the French gentlemen under which the remaining nine miles on each side would be done, and they would meet in the middle of the channel. If they were successful, the whole question was practically settled. Until the matter was proved, however, neither the French nor British investor would be asked to embark capital in the undertaking. The Southeastern shareholders were, as it were, the founders of the feast. They had taken all the risk, and they had authorized an expenditure of not more than £20,000 upon the affair. Now, a great deal of that which they wanted to prove had been proved. He meant to ask them to consider how best to make what had been proved more positive, and then to consider whether they should not get up a small limited liability company, or other company, to take the matter in hand without further interfering with the finances of the Southeastern Company. This was a question deserving serious consideration at their hands. They must, however, never forget that it was absolutely essential that this tunnel matter should remain under Southeastern control."

Should this tunnel ever be completed it would undoubtedly rank as the greatest engineering achievement of the century. The distance between the two trial points is about 22 English miles, and the depth of water varies from 50 to 250 feet in the channel. It is conceivable that the tunnel may be bored—although that is a tremendous task—but it is not easy to imagine how its regular working and ventilation is to be achieved. The use of compressed air engines instead of steam locomotives might assist in ventilating the tunnel, but as matters now stand, I fancy the public would prefer the 1½ hours sea journey and a possible taste of sea sickness to half or three quarters of an hour's imprisonment in darkness and in an atmosphere which must be horribly close and vitiated.

From the reports of the Inspectors of Mines of Great Britain for 1880, it appears that the English and Scotch collieries produced 146,669,409 tons of coal, and the iron mines 1,938,539 tons of iron stone. There were employed in the mines, underground, 301,351 persons, and above ground, 93,552. Twenty-eight explosions of fire-damp caused 409 deaths, a very unusually heavy loss, that in the preceding year being only 184 for 35 explosions. Falls of rock killed 462 men, and in shafts 91 lost their lives, while through various causes 178 men were killed underground. On the surface 88 accidents terminated fatally, carrying the total loss for the year to 1315 lives.

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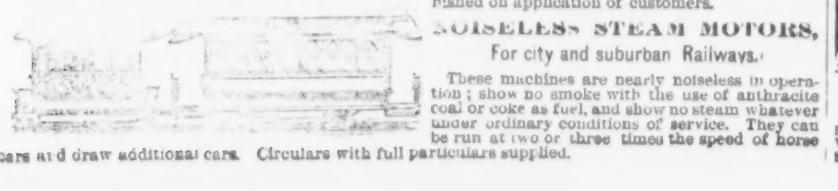
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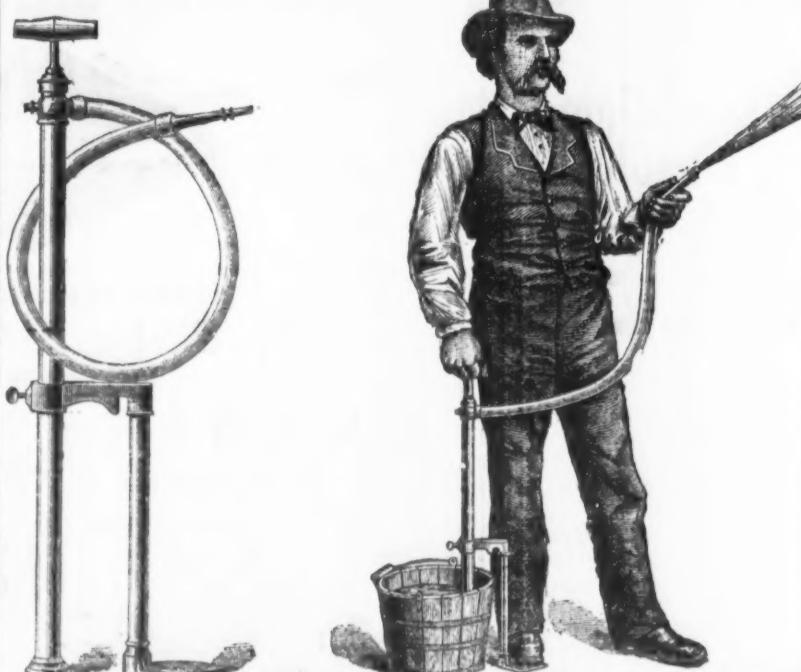
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Manganese Oxide.....	.09	Phosphorus.....	.16
Alumina.....	4.43		
Lime.....	1.52		
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Silica.....	14.09		
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The Economic Progress of England and America.

Mr. Frederick N. Newcome publishes in the *British Trade Journal* a paper from which we take the following, which affords much food for thought:

While the Old World nations have stood stationary, or but slowly added to their accumulated store, the United States has progressed with a speed almost defying realization. Scarcely a century has passed since the Americans cast off the British yoke and won the battle for independence, and yet they already rival England and France in magnificence and material wealth. When the present census valuation is complete, we expect to find the estimated gross wealth of the three countries considerably larger than before, while the United States will presumably prove the richest of the three. In fact, if the computations of national estate made in 1850, 1860 and 1870 are at all reliable—and we have the valuable authority of Mr. Cornelius Walford in deeming them of great comparative accuracy—the accumulated real and personal estate of our transatlantic cousins cannot be worth less than £8,000,000,000 sterling—probably much more. For our own part, we should adopt a considerably higher estimate, as explained later on. In judging of this matter, it must be borne in mind that the resumption of specie payment has resulted in a general appreciation of property throughout the States, and that the estimates will be made under more favorable conditions than obtained at the previous census, when the country was suffering from serious depression.

First let us contrast the rate of progress in the United States with that in this country. The commencement of the present century seems a suitable time to start with, as, thanks to the estimate made for William Pitt when first imposing the income tax and to an independent investigation undertaken by Dr. Beeke, the wealth of Great Britain and Ireland at that time can be tolerably well gauged. These computations give a gross accumulated estate of some £2,500,000,000, which in 80 years we have increased to about £9,000,000,000. We are consequently 3.6 times as rich as then. On the other hand, American statisticians compute the value of real and personal property in 1800 at \$1,072,000,000. In 1840 the income tax assessment showed a capital of \$3,764,000,000, which was increased in the next decade to \$7,135,780,000, then to \$16,159,000,000 in 1860, and to \$30,069,000,000 in 1870. The population at that date was 38,558,371, and the average property of each person about \$777. Now the States possess over 50,000,000 inhabitants, and, supposing the average is no higher now—which seems very unlikely, seeing that the mean value of each person's property shows continual progressive rise from \$220 in 1840 to \$307 in 1850, to \$510 in 1860, and to \$777 in 1870—the present wealth would be \$5,152,866 × 777 = \$38,868,776,582, or, say in round figures, \$28,000,000,000. But in all probability the average possessions will be found to exceed \$1000 in value, and this opinion is strengthened by the enhanced yield of certain taxes, and by the extraordinary rise in the assessment value of various townships. True, the population has increased by 11,594,495, or over 30 per cent, but this is of little moment if property has increased 80 or 100 per cent. meanwhile. It is quite certain the assessments in some districts are double and treble what they were in 1870. Taking what we consider the minimum basis of \$1000 per head, the gross capital in 1870 would largely exceed £10,000,000,000 sterling, and it seems unquestionable that, marvellous as are the resources of England and France, neither of these nations have yet attained to such a magnificent estate.

Somewhat curiously, the 30 per cent. rise in population accords almost exactly with an estimate made in 1865 by the *New York Bankers' Magazine* regarding the average decadal augmentation, but owing to the depression incident to the Civil War, the actual totals in 1870 fell somewhat short of those anticipated. The following shows how remarkably near the statistician was in his guess:

Year.	Population.	National Wealth.	Average Wealth of each Person.
Official assessment.....	1860 31,		

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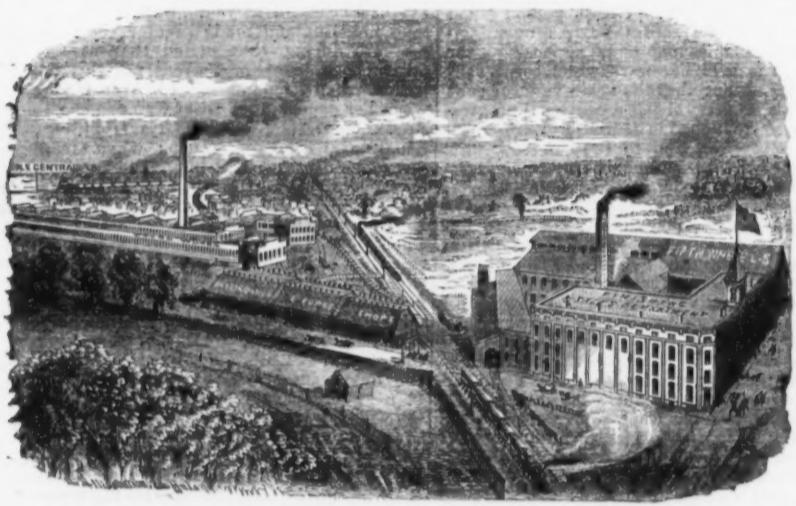
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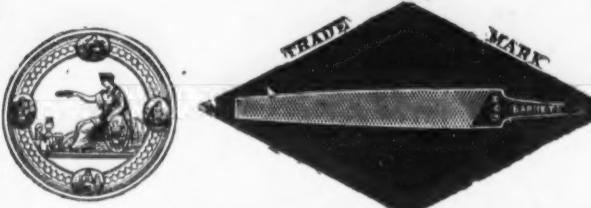
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Single Cylinder Versus Compound Engines.

The report, just issued, of the Chief Engineer of the Boiler Insurance and Steam Power Company, limited, of Manchester, England, contains the record of very interesting trials made by Mr. Niel McDougall to give some data as to the relative efficiency of single cylinder and compound engines. In order to make the comparison under conditions as nearly alike as possible he chose a simple expansive and a compound engine made by the same builder. The following is a description of both of these engines and a record of their work:

TABLE I.—DESCRIPTION OF ENGINES AND BOILERS.

	Engine B.—Compound.	Engine C.—Simple Expansive.
1. Description of engines.....		
2. Cylinders..... Number		
3. " " Diameter		
4. " " Stroke		
5. " " Ratio of volumes		
6. Piston rods..... Diameter		
7. Clearances in cubic inches.....		
8. Clearances..... Ratio to volume		
9. Steam pipe..... Swept by piston		
10. Intermediate pipe..... Diameter		
11. Exhaust pipe.....		
12. Air pumps.....		
13. Description of boilers.....		
14. Total grate area in square feet.....		
15. Total heating surface of boilers (sq. feet).....		
16. Total heating surface of economizer (square feet).....		
17. Total heating surface of boilers and economizer (square feet).....		
18. Grate surface per I. H. P. (at time of trial).....		
19. Heating surface per I. H. P. (at time of trial) economizer included.....		
20. Ratio of grate to heating Surface.....		
21. Total steam space.....		
22. Steam space per I. H. P. (at time of trial).....		

TABLE II.—RESULTS OF TRIALS.

	Engine B.—Compound.	Engine C.—Simple Expansive.
1. Duration of trial.....	5 1/4 hours	6 hours
2. Total number of revolutions by counter.....	14,710	29,802
3. Revolutions per minute.....	46.7	82.8
4. Piston speed in feet per minute.....	560.4	662.4
5. Mean indicated horse power.....	H. P. Cyls. 321 + Total L. P. Cyls. 314 + 635	540
6. Mean boiler pressure per indicator.....	71 lbs.	70 lbs.
7. Mean condenser vacuum per gauge.....	27 1/2 inches	27 inches
8. Mean barometer pressure.....	29.6 inches	29.4
9. Mean initial pressure in cylinders.....	H. P. 63 lbs.	61 lbs.
10. Mean temperature of feed.....	48° F.	42° F.
11. Mean temperature of injection.....	57 1/2° F.	46 1/2° F.
12. Mean temperature of discharge.....	92° F.	92° F.
13. Mean ratio of expansion, taking clearance into account.....	6.56	4.27
14. Total weight passed through boilers.....	63,570 lbs.	67,125 lbs.
15. Weight used per hour.....	12,109 lbs.	11,187 lbs.
16. Weight used per hour for donkey pump.....	120 lbs. (estimated)	100 lbs. (estimated)
17. Total weight per I. H. P. per hour.....	19.07 lbs.	20.7 lbs.
18. Net weight per I. H. P. per hour, deducting for donkey pump.....	18.91 lbs.	20.5 lbs.
19. Weight per I. H. P. per hour, calculated from the diagram.....	15.1 lbs.	18.8 lbs.
20. Percentage accounted for by indicator Efficiency.....	80	91
21. Weight required for perfect engine working between the same limits of temperature, with complete expansion.....	8 lbs.	8 lbs.
22. Actual efficiency compared with perfect engine.....	0.423	0.39
23. Total weight burnt.....	9546 lbs.	7616 lbs.
24. Total weight burnt per hour.....	1818 lbs.	1269 lbs.
25. Total weight burnt per I. H. P. per hour.....	2.86 lbs.	2.35 lbs.
26. Total weight burnt per square feet of grate per hour.....	22.37 lbs.	19.8 lbs.
27. Total weight burnt per square feet of heating surface.....	0.476 lbs.	0.406 lbs.
28. Description of coal.....	Hulton's Yard Slack.	Black Mine Engine Burgy, Dukinfield Deep Pit
29. Percentage of ash.....	11	8.2
30. Water evaporated per pound of coal at observed temperature and pressure.....	6.66 lbs.	8.81 lbs.
31. Equivalent evaporation from 100 at 212°.....	7.22 lbs.	9.53 lbs.
32. Evaporation per square foot of heating surface per hour.....	3.17 lbs.	3.58 lbs.

Although in the single-cylinder engine the steam was only expanded 4.27 times, it is evident from the figures given that the difference between the two engines in point of horse-power per hour for 3000 working hours—figures which show that a saving of a fourth of a pound of coal per horse-power per hour may be no importance whatever,

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OUR NEW PATENT
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RAZORS.

In all Styles.
To introduce we offer HOLLOW GROUND RAZORS at \$1.50, \$1.75, \$2; Ivory, \$2.50. Our SWEDISH GEM RAZOR \$1.75, \$2.50; Ivory, \$2.50. Our own make, and warranted the best cutters in the world. A sharp, fine, well tempered steel, and a dull razor will剃 for 75 cents a Strop warranted to set a fine edge to any razor. If in morocco case, \$1.

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J. B.—The high reputation won by these razors made by ENGSTRÖM in SWEDEN induced some Engish makers to imitate the form and shape of the razors blades the words "Swedish Razors" and other makers to imitate more closely Engstrom's style. To distinguish the genuine, and to prevent imitation, the name of the maker is stamped on the shank of the razor. JOHN ENGSTRÖM.

PRICES are \$2.00, \$2.50, \$3.00, \$3.50 each.

A SHOW CASE containing one razor of each of the eight styles as samples, with a strap made expressly for Engstrom's Razors, will be mailed to any DEALER, on receipt of Post Office Money Order for \$14.75, which covers all charges for packing and mailing.

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AND
SHOE KNIVES.

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Ice Cream
Freezers.

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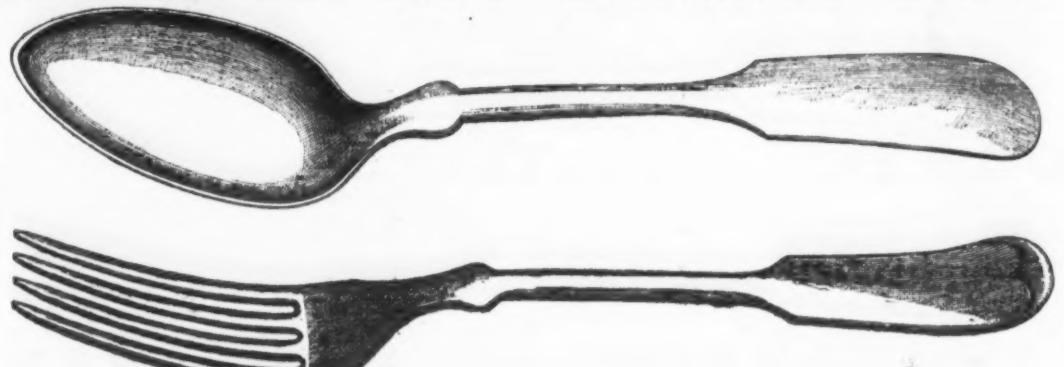
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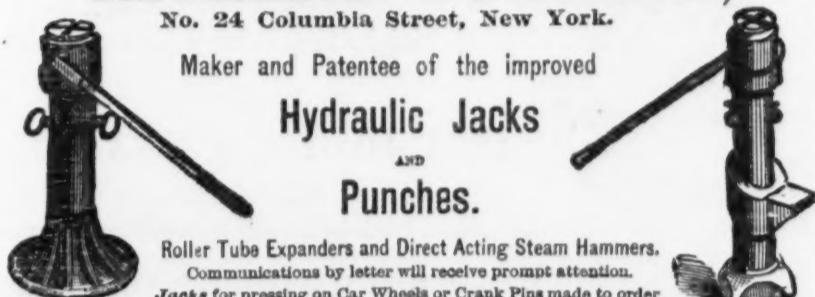
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New price lists ready.

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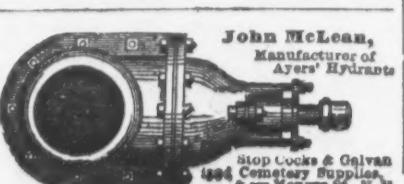
Phosphor-Bronze is daily gaining favor with manufacturers who have to use a metal of great toughness and durability, of fine grain, high tensile strength and ductility, and is acknowledged far superior to any other alloy on account of the readiness with which it takes a polish, its elasticity, fluidity and beauty of color. Its high price, however, has limited its use to the few who can afford an extent as its merits would warrant. For the first time an article is offered here with which makes it easy for everybody to manufacture his own Phosphor-Bronze of the grade it is wanted, by the simple process of melting. This article is PHOSPHOR-TIN. By melting a very small quantity of it with copper an excellent Phosphor-Bronze is obtained at a much cheaper price than the ready made Phosphor-Bronze to be had in the market. A trial ought to be made by everybody who is using it.

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and may, indeed, be more than counterbalanced by the outlays entailed in other directions.

New York Industries.

Mr. Charles E. Hill, Chief Special Agent in this city of the Census Office, has made a summary of the manufacturing industries of New York, excepting the manufacture of cotton, wool, silk, silk goods and mixed textile fabrics, iron and steel, gas, glass, coke, the fisheries, oyster canning and packing, breweries and distilleries, shipbuilding, railroad car repair shops, salt, petroleum, mining and refining and the mining industries of the county, these branches having been assigned to special experts. The summary gives the number of establishments in each branch, the capital invested, the value of the material and the product, the number of men, women and children employed and the wages and hours of labor. The principal industries are as follows:

Business.	Capital.	Material.	Product.
Artificial flowers and feathers.	\$1,302,000	\$2,72,905	\$5,040,891
Billiard tables and material.	315,469	273,442	439,390
Bookbinding.	2,345,052	2,20,527	4,947,876
Boots and shoes.	1,944,603	3,683,093	7,543,693
Candy, fancy and paper.	678,575	1,051,609	2,022,565
Bread and other bakery products.	2,073,056	6,046,762	9,405,754
Buttons.	155,000	167,350	421,627
Catering.	1,725,684	3,433,074	7,511,384
Cars, street and road-pairs.	316,745	260,532	547,937
Carts, horses and wagon.	1,133,900	1,041,825	2,613,201
Clothing, men's.	2,345,052	2,20,527	4,947,876
Clothing, woman's.	4,207,062	11,518,494	18,599,357
Comins and undertakings.	1,369,000	2,491,375	5,08,635
Corsets and hoop-skirts.	180,500	245,409	1,008,103
Collars and cuffs.	327,000	688,611	1,641,284
Confectionery.	1,544,558	3,037,375	4,590,582
Cordsets and hoop-skirts.	179,000	385,051	685,213
Cutlery and edged tools.	41,900	17,119	55,760
Drugs and chemicals.	2,920,473	3,690,575	8,180,178
Furniture.	641,451	47,700	1,120,366
Wood engraving.	7,933	8,138	15,434,853
Flour and grain mill products.	1,835,975	2,420,441	6,867,079
Fool preparations.	257,000	387,927	770,921
Furniture.	420,000	400,000	1,000,000
Furs (dressed).	2,650,873	2,643,517	4,474,000
Gas and lamp fixtures.	6,940,000	9,654,504	24,705,766
Glaziers, cut and ornamental.	5,670,575	18,561	1,247,501
Hairwork.	134,575	200,610	510,300
Hardware.	6,940,000	50,640	1,37,666
Hats and caps.	1,924,575	1,925,206	4,22,003
India-rubber.	15,750	2,075,170	3,74,496
Ink, printing and writing.	59,000	195,000	181,500
Instruments, professional and scientific.	309,750	97,430	309,347
Ivory bone and shell goods.	361,023	504,519	877,784
Jewelry.	2,580,533	3,491,627	4,655,760
Leather work.	8,383,40	128,000	3,74,496
Lard refiners.	1,920,000	24,705,766	24,705,766
Lead, pipe, sheet and shot.	818,575	1,189,917	1,619,917
Leather, tanned.	1,041,542	609,419	1,000,000
Leather goods.	1,920,000	1,000,000	1,22,237
Lithographing.	1,203,750	388,350	1,74,496
Looking-glass and picture frames.	680,150	1,177,467	2,071,420
Lumber.	1,725,000	199,000	2,008,911
Machinery.	3,614,373	2,606,147	4,977,076
Machinery, engines and boilers.	2,912,300	1,514,771	3,413,371
Machinery, foundry.	5,670,000	1,000,000	1,000,000
Marble and stone-work.	2,155,180	2,075,170	5,686,556
Masonry, brick and stone.	2,155,180	2,184,798	2,184,798
Metallurgical goods.	624,000	1,060,433	1,019,741
Milking and lace goods.	97,900	1,975,514	1,980,162
Musical instruments.	310,325	2,606,616	4,410,866
Oil-margarine.	5,500,000	3,710,451	371,430
Painting and varnishing.	1,203,214	1,203,214	7,739,413
Paints and materials.	4,624,372	2,059,837	6,927,935
Patent medicines.	1,611,000	467,000	1,000,000
Perfumery and cosmetics.	377,050	625,000	1,004,700
Photographing.	444,100	343,177	1,140,427
Plumbing and gasfitting.	664,500	1,867,510	5,000,000
Postage.	5,500,000	5,000,000	5,000,000
Saddlery and harness.	480,273	480,273	1,037,762
Sewing machines.	61,500	71,950	366,102
Shirts.	1,314,700	7,023,215	4,195,915
Slaughtering and meat packing.	1,601,000	21,765,377	29,237,627
Soap.	309,508	321,116	788,420
Stationery goods.	5,500,400	2,627,697	4,39,927
Sugar and molasses, refined cane.	2,114,325	2,065,435	3,407,088
Tobacco and tobacco products.	1,203,000	199,000	731,935
Cigars.	1,203,000	1,203,000	1,203,000
Toys and games.	2,700,000	2,694,079	3,443,356
Turnery.	944,550	2,075,170	2,075,170
Umbrellas and canes.	949,707	1,921,313	2,075,170
Upholstering.	177,000	358,111	416,140
Watch and clock repairing.	177,000	358,111	416,140

ment of its advantages was prevented by inability to increase the blast. In 1855 William Firstone manufactured good gray forge iron at the Mary Ann Furnace, in Huntingdon County, with coke produced from Broad Top coal. In the same year F. H. Oliphant, of Fairchance Furnace, near Uniontown, exhibited at the Franklin Institute, Philadelphia, samples of iron made from blue lump ore, smelted with coke. In 1859 the Great Western Iron Works, at Brady's Bend, built four coke furnaces. In 1861-2-3 coke was made on the banks of the Youghiogheny River and shipped in flat boats to Cincinnati. A gentleman, who is well informed in all the details of the coke business, says that Dud Dudley, an English iron manufacturer of the sixteenth century, is entitled to the discovery of coke. He used it for the same purpose to which it is applied now—smelting. The manufacture of coke in the Connellsville region did not rise to the dignity of a business until toward the close of the decade of 1850, when it was carried on principally at Dawson's Station, on the Youghiogheny River, six miles below Connellsville, by the Cochran's, who are still in the business, and to most of whom it has brought great riches.

The coal was placed on the ground, either in piles or ridges, and burnt after the manner of a lime kiln. This is known as the Weller process. For many years the entire product was shipped by water to St. Louis. At one

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Malleable Iron and

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Tinned (pure Tin).

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FAST SHACKLE JAIL LOCK

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These Wrenches are made from the best of Wrought Iron, with Steel Head and Jaw, case-hardened throughout, and not only combine all of the superior qualities of our Cylinder or Gas Pipe Wrenches, but also all requisite Combinations of a regular Nut Wrench, thus making a combination which has no equal.

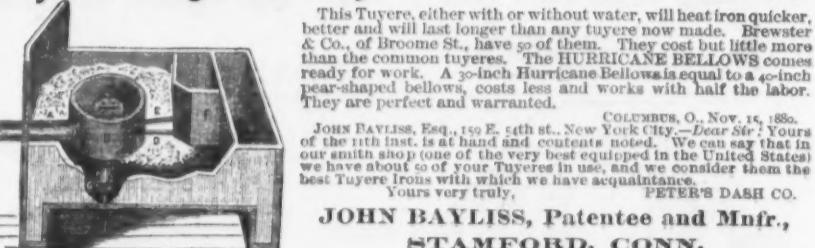
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COLONIAL, O. Nov. 14, 1880.
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Yours very truly,

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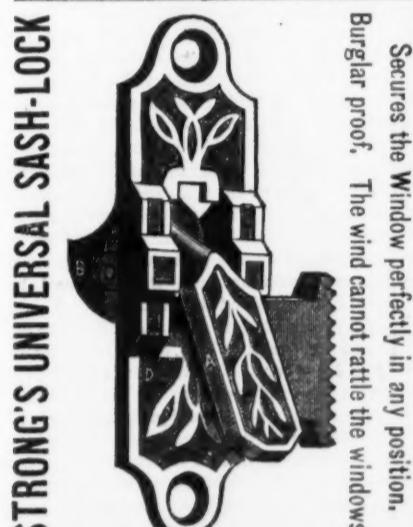


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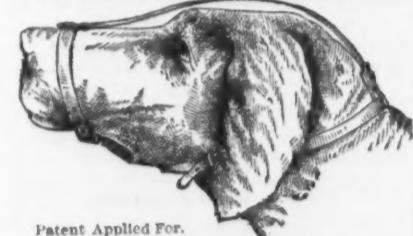
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MALLETS,

Hawsing Beetles, Hawsing and Calking Irons;
also all kinds of Handles, Sledge, Chisel and Hammer Handles. Also

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Circular Woven-Seamless Antiseptic RUBBER LINED "CABLE" HOSE and "TEST" HOSE, Vulcanized Para Rubber and Carbolized Duck, for the use of Steam and Hand Fire Engines, Force Pumps, Mills, Factories, Steamers, Ships, Hospitals, &c.

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Emery Wheels and Packing.

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Emery Wheel.

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LARGE WHEELS MADE ON CAST-IRON CENTER IF DESIRED

Emery Wheel.

Section of Emery Wheel showing Iron Center.

Emery Wheel.

may be an opportunity that will favor a reduction in our tariff. The correspondent of the New York *Tribune* telegraphs, under date of July 9th: "The *Economist* again criticizes the debt reduction policy of the American government, and calculates that the present unprecedented surplus will probably be increased during the ensuing twelve months. It contemplates the probability of the whole outstanding debt being converted before many years into three per cent. bonds. It urges that taxation is kept needlessly high, because the lowering of the interest is not dependent on maintaining the present rapid rate of payment. The *Economist* makes all this the basis of an argument against the tariff, desiring to apply the surplus revenue to the reduction of the import duties rather than the reduction of the debt." There is no doubt but some such argument as this will be used as a reason why the tariff should be reduced. Protectionists have seen this for some time; but there are other alternatives than those the *Economist* suggests. For example, the internal revenue receipts can be very much reduced—the bank check tax, patent medicine tax and whisky tax. There is a large, respectable and growing party in this country that question the propriety of supporting this government by a tax on whisky. The difficulty of its collection, the trouble and deaths connected with the enforcement of the laws against illicit distilling, have led many to think that the internal revenue can be reduced and the duties maintained, and our surplus revenue not remain so large.

Grievous complaints are made by official inspectors and appraisers at the Custom House in this city, as well as by steamship companies and passengers arriving from Europe, of a secret system of espionage over all baggage landed at this port. The chief agent is described as a German, formerly a runner for the Pennsylvania Railroad Company, but who was discharged, and immediately reappeared as a full-fledged government official under the Collector, but exercising authority superior to the regular inspectors and appraisers. Baggage already regularly examined and passed is liable to be intercepted, wherever found, and the owner subjected to serious detention and losses. Among the sufferers named is a member of the British Embassy in Yokohama, the late Republican candidate for Governor in a neighboring state, a well-known banker and railroad manager, a lady whose benevolence is known all over the country, &c. When the new Collector, Senator Robertson, assumes the duties of the office, he will doubtless give this subject the attention which it deserves.

The Montreal Board of Trade are greatly agitated by the prospect that the Canadian lines of telegraph will be absorbed by the Western Union of the United States. A resolution, unanimously adopted last week, declares that such an arrangement will tend to the great injury of the interests of Canada, and the president of the board said: "The proposal to hand over all the telegraph wires of the Dominion in the way indicated, amounts practically to an attempt to rob the Dominion of the sum of \$300,000 or \$400,000, invested by the government in extending the telegraph system of the Gulf and its islands for the benefit of Canadian commerce and fishing interests, by putting these works at the control and mercy of men whose chief interest is to enrich themselves, and who would naturally first see that all valuable shipping and meteorological information should be used for United States interests." The Canadians are becoming very sensitive to alleged Yankee encroachments on their side of the line.

The Treasury Department has rendered a decision of some interest to importers of scrap iron, which, we think, will scarcely stand the test of judicial scrutiny. Certain Philadelphia importers appealed from a decision of the Collector at that port, requiring the payment of \$8 per ton duty on so-called "dirt," imported as part of a lot of 520 tons of scrap iron. They claimed that although this was weighed in with the scrap in discharging the vessel, it was of no value, being simply rust which had scaled off during the voyage. The Department holds that it is not "dirt," but oxide of iron, and that in iron yards this is carefully preserved and sold for commercial purposes. Although admittedly not worth as much as scrap iron, the Department rules that it is dutiable at \$8 per ton. Now, it requires no argument to show that this loose stuff is not scrap iron, whatever else it may be, and that it should not be classed as such. The tariff specifies several kinds of iron oxides, colcothar being free; venetian red dutiable at 25 per cent. ad valorem, and oxide of iron, as a medical preparation, dutiable at 40 per cent. ad valorem. The fact that this rust started as scrap iron does not make it scrap when it gets here, as it has changed its character and is much nearer to an ore than it is to iron. Moreover, it has gained in weight by this change, and if all this loose stuff is to be weighed in, it might, in a rigid interpretation of the law, in the light of this decision, falsify the invoice. The question is an interesting one.

The title of Mr. John Birkinbine's valuable paper on "Blast Furnace Hearths and

Linings," printed in *The Iron Age* of July 7th, was unfortunately made to read "Blast Furnace Hearths and Chimneys." This was an error of the types not readily explained, as the words "chimneys" and "linings" bear little resemblance to each other when written.

NEW PUBLICATIONS.

ANNUAL REPORT OF THE SECRETARY OF INTERNAL AFFAIRS OF PENNSYLVANIA. PART III.—INDUSTRY STATISTICS. By Hon. Miles S. Humphreys, Chief of Bureau, Harrisburg, Pa.

The Annual Statistical Report of Pennsylvania is, as usual, full of interesting and valuable matter. Mr. P. U. Shaefer, of Pottsville, in a paper embodied in the volume, continues his vigorous crusade against the excessive waste of coal in mining, and we notice in other portions of the report similar efforts to call attention to a great evil. Mr. Shaefer has agitated the subject before and is entitled to credit for what he has done, but we fear that there is little chance of any improvement until the coal operators are taught that it will pay them to take out a larger amount of coal with less waste. That the loss is "fearful" will be conceded. Let Mr. Shaefer and those who agree with him begin the good work of showing how it is to be avoided. Mr. William Wilcox, Inspector of the First Bituminous District, speaks of the same subject, but more directly with reference to bituminous coal. He makes some very good practical suggestions. Let Mr. Shaefer do the same. Mr. William E. Richards, Inspector of the Third District, in discussing the fact that many mines are ignorantly and recklessly managed, speaks incidentally, too, of the waste. He urges that the mines should be placed in charge of competent men, and undoubtedly touches a sore spot in doing so, but his suggestion that the State appoint an examining bureau to examine candidates as to their fitness to take charge of and conduct underground work, is of doubtful value. Such a method of dealing with the difficulty would not be likely to be effective. The fact that the State possesses a great interest in a proper working of its collieries, would not entitle it to direct interference in the manner in which they are worked. It can do much, however, by encouraging the development of training schools for inside bosses and foremen, such as that now successfully started at Dritton by Cox Bros. & Co., under the guidance of Mr. Oswald Heurich, who undoubtedly takes rank among our best practical mining engineers. Mr. Shaefer and the inspectors can do very much good if they will follow out this matter persistently, but they must distinctly understand that legislation will not do it. Among the other interesting subjects brought up in the report, outside of the usual statistical data, is a paper on the "Textile Fabrics," from the pen of Mr. Lorin Blodgett, whose ability in this special field is recognized. The statistics on wages are much more complete than usual, and the returns made by employers themselves are of very great interest. Running over the figures, we notice that the income of the workingmen at our iron and steel mills averages very high, being frequently above \$1000 per annum, although very often they do not work full time. Mr. John H. Kerr contributes a valuable paper on "Building and Loan Associations," and in connection with it the department has gathered interesting figures on the capital, resources and liabilities of these societies which have not until now been presented in so complete a form. The mine inspectors' reports in general show satisfactory progress, and contain descriptions of new appliances, among which we would mention S. Diescher's coal-washing machine. The report concludes with a collection of the labor laws of Pennsylvania.

L'INGENIER. Published by M. Bernard, Paris.

The well-known English technical journal, *Engineering*, has met with such appreciation in France that M. Bernard has concluded to reproduce in French, in a special journal, a selection of its articles, to which it appears, from its first number, original correspondence and articles are to be added.

English Trade Unions in 1880.

During the last five years the British trades' unions have experienced a pressure more severe than has ever before fallen to their lot; their resources have been strained to the utmost, their stability has been subjected to a searching trial, and their capability for dealing with difficult problems connected with labor has been tested to an extent hitherto unknown. The ordeals through which they have had to pass have also sorely tried the efficiency of their modes of management, and put to the test the whole of their internal economy. The first three years of the great depression in trade through which that country has been passing—namely, 1876, 1877, and 1878—were sufficiently trying; but the year 1879 exceeded each of the others in its severity. It seemed, indeed, at one time, that it would undermine their very foundations, and reduce them to mere wrecks, as compared with their former wealth and strength. In that year, however, the lowest point was reached, and 1880 brought with it some relief and helped to restore partial confidence.

Five societies are examined by the statistician by way of example, for the simple reason that in their constitution, organization, and method of government, they are almost identical in all essential particulars, while their rules, contributions, payments for benefits and the like, are very similar. In the first place, they are all what is now called amalgamated societies; that is to say, they have each a network of branches all over the country, with central offices and a governing council. Secondly, the rules as to membership, qualification, admission and conduct differ but very slightly. Thirdly, the rates of contribution are the same—1/- per week—in all cases except one, that of the steam engine makers, with whom the contributions are 9d. per week. In the matter of levies their action is much the same. Fourthly, the benefits vary somewhat in amount, but not materially, as will

be seen further on. The numerical strength of the five societies selected, at the close of 1880, was as follows:

Name of society.	Branches.	Members.
Amalgamated Society of Engineers	405	44,692
Friendly Society of Ironfounders	121	11,247
Boiler Makers' & Iron Shipbuilders'	171	18,358
Steam Engine Makers' Society	75	4,134
Amalgamated Carpenters' and Joiners	354	27,754
Totals	1,126	96,225

This shows an increase of 20 branches and of 1719 members during the year, one society only showing a decrease—the ironfounders. The net income and total expenditure of the five societies were as under:

INCOME.	£	s.	d.
Amalgamated Society of Engineers	126,047	15	6
Friendly Society of Ironfounders	45,935	17	9
Boiler Makers' and Iron Shipbuilders'	48,153	9	2
Steam Engine Makers' Society	9,552	19	3
Amalgamated Carpenters' and Joiners	42,173	8	1
Totals	272,583	9	4

EXPENDITURE.	£	s.	d.
Amalgamated Society of Engineers	130,090	9	0
Friendly Society of Ironfounders	41,301	3	0
Boiler Makers' and Iron Shipbuilders'	34,054	3	9
Steam Engine Makers' Society	9,552	19	3
Amalgamated Carpenters' and Joiners	40,566	9	0
Totals	273,564	9	8

These totals show a decrease of income on the year of £2676. 3/11, but this decrease was the result of fewer levies. The expenditure shows the enormous decrease of £197,494. 3/9. Nevertheless, the expenditure exceeded the income by £981. 7/4, so that the strain, though lessened, is not entirely gone. The particular point where the pressure of that strain was the most intense will presently appear.

With regard to benefits, the societies under review excel all others. In one respect they are unique, namely, in the provision they make for the relief of members out of employment. In the whole range of benefit societies or insurance corporations there is nothing like it or approaching to it; and it must be borne in mind that all benefits are covered by a contribution of 1/- per week, except in the event of there being exceptional demands on the funds, in which case temporary levies are put on. The amounts provided for in the rules and guaranteed of the several benefits are given in each separate table, side by side with the gross payments of each society for the past year.

The term used in most societies for out-of-work allowance is "donation." This form of relief is usually divided into two classes, called, respectively, "home donation" and "traveling relief." Latterly, allowance is granted in another form as well—namely, in payment of fares to situations or jobs at a distance—a most useful provision, for it assists migration. In former times "traveling relief" was the only form of relief granted. Now, however, "tramping in search of employment" is not so general as it used to be, and the system is discouraged to a certain extent. And no one need wonder that it is so, for tramping had degenerated into an organized system of "cadging," and the funds of the society were requisitioned to support "professional trampers." Even now the class is not quite extinct. During the recent depression in trade both migration and emigration were equally fruitless, for work was scarce and labor plentiful, not only in the United Kingdom but all over the world. Home donation, with payment of railway fares in the event of a job being offered, is now fast superseding the old method of tramp relief, the evils of which had long been recognized, and it has this advantage over the latter practice—namely, the wife and family of the member are able to share the allowance, whatever it may be; whereas, under the old system, the entire amount granted barely sufficed to keep the traveler day by day.

The Commercial Travelers.

The National Commercial Travelers' Association met in Detroit last week, the president, Mr. James H. Eaton, of Syracuse, in the chair. Mr. Eaton in his opening address said:

We connect the producer, the importer, the jobber, the manufacturer, with their customers. We enable a party to have exhibited their goods, wares and merchandise, not to two, five or ten customers in a day, but to a hundred or thousand. We display to a dealer in a small town far from the great thoroughfares and arteries of traffic samples of the whole world's productions. We carry on not only an inter-town and inter-State, but an international commerce. Our name is legion. In the State associations represented in this convention, our membership aggregates tens of thousands, and through these same State associations we are carrying an insurance upon each other's lives, amounting to over \$50,000,000—one association of our number having already collected and distributed \$500,000 among the families of its deceased members. Our sales during the year reach far into the hundreds of millions of dollars, and to do this we travel millions of miles, and are followed by millions of tons of freight, as the results of our efforts. Can we not then truthfully claim that we are the auxiliaries of commerce, and her faithful laborers.

Five societies are examined by the statistician by way of example, for the simple reason that in their constitution, organization, and method of government, they are almost identical in all essential particulars, while their rules, contributions, payments for benefits and the like, are very similar. In the first place, they are all what is now called amalgamated societies; that is to say, they have each a network of branches all over the country, with central offices and a governing council. Secondly, the rules as to membership, qualification, admission and conduct differ but very slightly. Thirdly, the rates of contribution are the same—1/- per week—in all cases except one, that of the steam engine makers, with whom the contributions are 9d. per week. In the matter of levies their action is much the same. Fourthly, the benefits vary somewhat in amount, but not materially, as will

your consideration: 1. Experience has taught us that we are wasting time and effort in approaching the different railroad corporations singly and alone, for while we have been treated politely and courteously, and have in some instances obtained the concessions which we have asked for, yet, as a general thing, we have been referred to the general ticket and passenger agents, with the information that this matter came more directly in their line and must be arranged by them. We therefore recommend the appointment of a strong committee, to draw up in plain form, without argument or verbiage, a document specifying just what we ask for and think should be granted.

2. That this committee be instructed by the convention to present such document to the General Ticket and Passenger Agents of the United States, when assembled in convention, being prepared to explain and defend the same, and endeavor by all honorable means to secure the concessions asked for.

3. We recommend that the amount of baggage on which free transportation is asked for be left to the discretion of the committee, and that the rates of railroad fare, &c., be arranged on a scale of percentage, reduced from the regular through fare of the respective lines.

4. That the matter of reduced hotel rates to members of the National Association (for the present at least) be laid upon the table.

In submitting these recommendations for your consideration we are aware of having opened a broad field for discussion, yet we hope to be perfectly harmonious in our deliberations, and also hope that we shall succeed in securing tangible benefits for ourselves, for our successors and for the associations we represent.

If we do this we feel that the National Association of Commercial Travelers of the United States has not labored in vain, but has accomplished the object for which it was organized.

Bullion in the New York Assay Office.

It costs \$1200 to send \$5,000,000 in bullion from the New York Assay Office to the Philadelphia Mint. That is why a room in the Assay Office is at present walled around with gold brick. The weight of \$5,000,000 is 8 1/4 tons, or, more accurately, 16,585 pounds. Congress was asked for \$50,000 to cover the expense of transporting bullion to the mint, but it only appropriated \$20,000. Between the 2d of August last and May 1, \$90,000,000 in gold was received in the Assay Office, and, for lack of money to send it to the mint, \$60,000,000 yet remains on the hands of Superintendent Thomas C. Acton. This \$60,000,000 weighs about 99 tons. A man who should own it would be able to wall himself up in it as in a well, and the well would not be so wide or so high but that he could stand in the middle and touch every brick. The number of gentlemen in this country who could perform this interesting experiment with their own gold is small. The bricks in the Assay Office average about \$4000 apiece in value. The most of them are not much to look at. They are as black and dull in color as a cheap quality of stove-pipe. If you scratch one with a knife, you make a bright yellow mark, and this mark will not get black again. These black bricks are composed of melted foreign coins, containing about the right amount of alloy for American coinage, and so the alloy is allowed to remain in them. When the melted gold is poured into the molds, the oxygen of the air attacks the copper of the alloy and turns it black. If it were worth while to protect the bricks from the air until they got cold, they would never get any darker in color than a gold coin would. Two-thirds of all these bricks are made of French 20-franc pieces. Those bricks made of gold directly from the mines are very nearly pure metal, and are as bright as coins. The drainage from all this gold, if it were put at interest at 5 per cent., would make a golden stream of \$342 an hour running day and night.

"I know just as well how much gold there is in this room," Superintendent Acton said, as he gazed about at the piled-up wealth, "as I know my own age, but notwithstanding that it must all be weighed again in anticipation of the account to be rendered by July 1. If we had money enough to send it to the Philadelphia Mint, we would not have the great trouble of weighing it. About \$100,000 of it only is put on the scales at a time."

Six men were at work. Down the faces of all but two of them the sweat rolled, and their hands were grimy with black oxide of copper. They tugged at the gold bars like longshoremen unloading pig iron. A heavy platform truck, on four small wheels, was rolled into the room, and on this about 25 bars, or bricks, taken from the built-up golden walls on three sides of the room, were laid. The truck was then drawn along the floor by four men, two pulling and two pushing, into an adjoining room, where the scales were. The scales are about 5 feet high, and the index needle is more than 4 feet long. The beam and the pans are suspended on steel edges as sharp as knife blades, to avoid friction. When the small weights had been added to the large ones to balance the gold, the point of the long index needle would tremble over the middle line of the ivory graduated scale. This pair of scales is of a kind so delicate that when brought to a balance with two pieces of paper of equal size in the pans, the mere writing of a name with a lead pencil on one of the pieces of paper will add enough weight to the paper to turn the scales in its favor. This has actually been done on one of the scales in the assay room, but that pair is protected from air currents by a glass case.

The men who handle the gold, though not differing much in outward appearance to the casual observer from coal heavers, are, in fact, men of intelligence, of approved reputation, and who have received good pay.

"We would not have all this trouble," said the chief weigher, as he put a 500 ounce weight gently on the scales with his right hand and wiped off his brow with his left, "if we had arrived at the 'parliament of man, the federation of the world.' What we sigh for here is an international system

of coinage. The most of all this weight came to this country as good foreign coin, but its lack of uniformity with our mintage compels the United States to recoin it, and me to fight these weights all day."

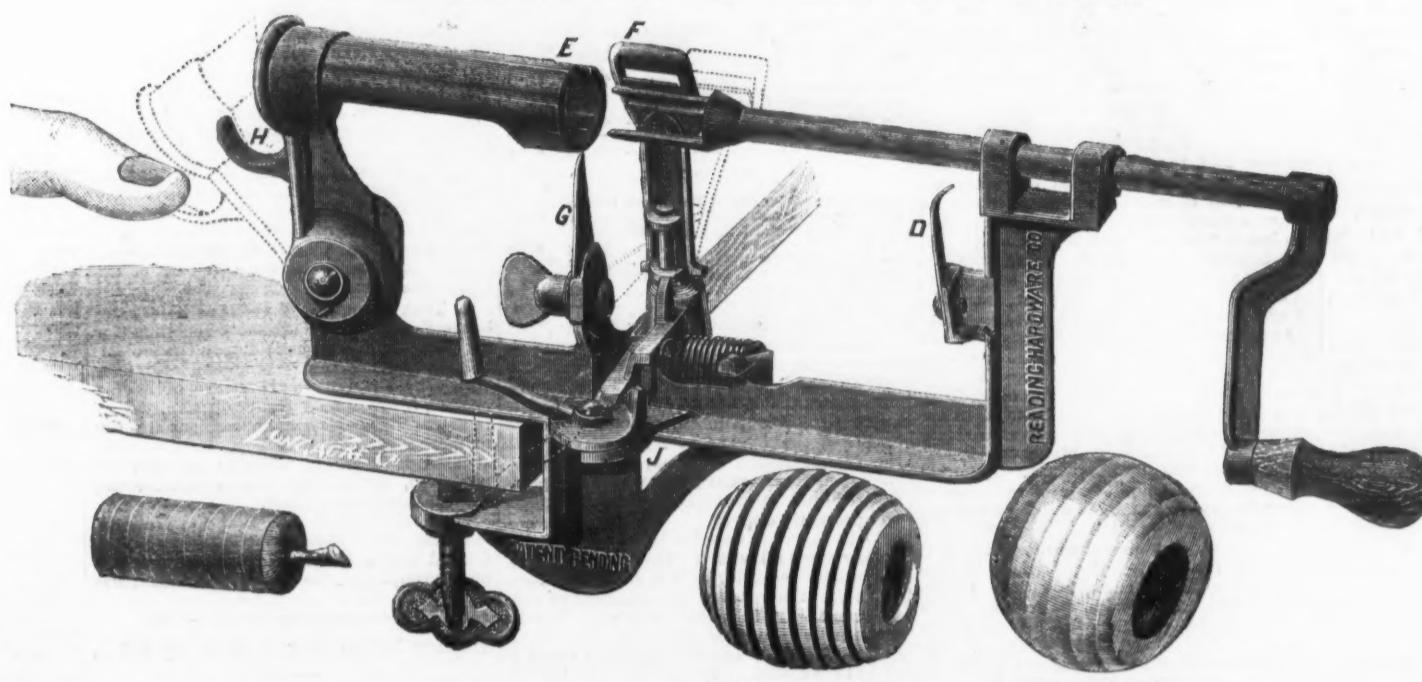
A larger supply of foreign coins than usual has come into the country since August last, because the rate of exchange has been in our favor. It was explained that the most of the

APPLE PARER, CORER AND SLICER.

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PATENT PENDING.Will either Pare, Core and Slice;
Pare and Core, or Core only.

The Most Complete Machine of the

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FOR PARING, CORING AND SLICING.—Place the apple on the fork; by one turn of the crank the small Knife D removes the paring from the base; continue turning, and move the apple toward the mouth of the Tube E; the Paring Knife F and Slicing Knife G will perform their functions; the apple will be drawn on the Tube E by the internal screw which removes the core. To remove the apple, raise the end of the Tube E by pressing on the Hook H at the opposite end.

FOR PARING AND CORING.—Drop the Slicing Knife G by loosening thumb screw; proceed as before.

FOR CORING ONLY.—Drop the Slicing Knife G, throw back the Paring Knife F by aid of the Cam J; proceed as before.

The shaft is so arranged that the fork will not come in contact with the paring knife (a serious defect in other machines of this kind), and by merely throwing the paring knife backward the largest apple can be placed on the fork without difficulty. In its adjustment to the table the arrangement is such that the parings and cores will drop into a receptacle placed beneath, thus leaving the pared fruit entirely clean and free from offal. Every machine warranted as represented.

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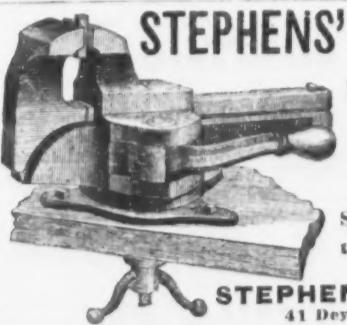
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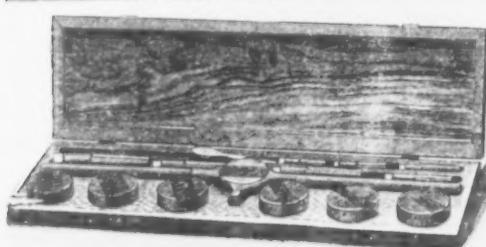
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And LABOR SAVED!
BY USING
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Variable Blast Tuyere Iron**

This cut represents the interior of the Tuyere, showing the rotating air tubes through which four different sized currents of air may be passed, thereby making any sized fire from two to 18 inches in diameter; for instance, if a large fire is being used and the next job should be a nail rod, we do not move or burn the large bed of coal,



but turn the small tube up and so concentrate the heat to the point desired.

The constant flow of water keeps the Tuyere cool and prevents cinders or clinkers from forming in the fire. To prevent the water from freezing in the pipes, the barrel is supplied with a faucet that empties the pipes but not the barrel. All the dirt from the fire sifts through the perforated fire cap into the dirt box, from which it is blown by the blast when the ball valve is raised for that purpose. I also furnish Tuyeres Irons without water attachment. See first issue of the month.

After having used your "Variable Blast Tuyere Iron" three months, I pronounce it perfect in every respect, and it actually saves from 25 to 50 percent of the coal. CHAS. VAN HORN, Earlville, Ill.

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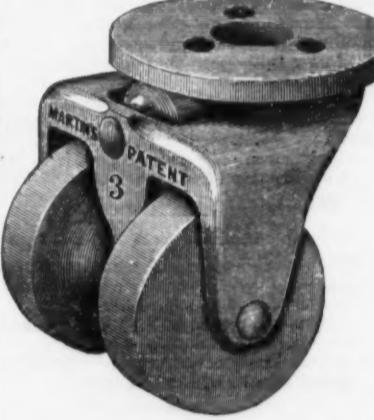
1878.....Amount, \$14.55

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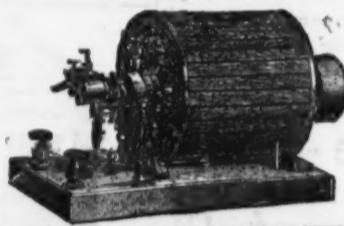
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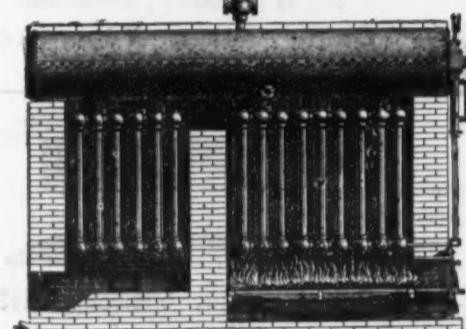
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For determining the constituents of a Clay, Slag, Coke, or of an Ash in Coal the charges will correspond with those for the constituents of an ore. For a written opinion or letter of instruction the charge must necessarily depend upon circumstances.

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Send for quotations and samples.

INDUSTRIAL ITEMS.

MASSACHUSETTS.

The Washburn Iron Company's works, at Washington Square, Worcester, were shut down last Saturday for repairs. An entirely new set of machinery will be put in, and the works are expected to be ready to start about October 1 for the manufacture of steel rails. Heretofore the company have made iron rails.

The Lowell Machine Shop, Lowell, has received orders during the past week for Foss and Pevey Cards from the Hutchinson Manufacturing Company, Bowensville, Ga.; Lees Manufacturing Company, Westport, Conn.; and Hadley Thread Company, of Holyoke.

N. R. Davis & Co.'s gun factory, at Assonet, employing about 30 hands, has started up on full time after a week's vacation.

From 500 to 800 guns are turned out monthly.

The Brainard Milling Machine Company, of Hyde Park, have purchased from the Hall estate a large tract of land adjoining the mills. To the main mill an addition of 50 feet has been built for the erection of machinery and to accommodate a blacksmith shop.

The Cape Ann Forge Works, of Gloucester, have added a 6000-pound hammer to their works and have also made other additions to their facilities, and are now enabled to turn out a heavier class of forgings than formerly.

There are many building projects being agitated in Chicopee Falls at present, among which are an iron foundry by the Belcher Bros. and a shop for the Whitcomb lawn-mower.

The Deane Steam Pump Company, of Holyoke, has recently opened warerooms in Chicago.

J. C. Smith has leased the building now occupied by the Postal Card Works, Holyoke, and is to remove his Bigelow street machine shop there as soon as the building is vacated.

The Springfield armory is now running in all the departments with about 30 men less than were employed last year, or 250 in all.

Anthony & Cushman, tack manufacturers, Taunton, have purchased the buildings of the screw works, off Court street, and will immediately remove their machines and apparatuses for the manufacture of tacks and show nails. They are also going to add a large number of new machines to enable them to fill their orders.

CONNECTICUT.

The Pratt & Whitney Company, Hartford, have added 100 hands during the past six months, making their force now upward of 700 workmen. There are orders for 200 engine lathes of 13 inches swing, and of beds of 4, 5 and 6 feet; 60 16 inch swing lathes to be delivered September 1, and 2 14-inch shapers, nearly ready, for the Kansas & Topeka Railroad. The new department has, on one floor, 13 planers of 40 and 48 inches opening between uprights, and 20 feet bed. Several large horizontal boring mills are being made in the works, of 15 inches range, 42 inches swing and 14 feet bed, 2 of them for the home factory. Rock cutters, milling machines, screw machines, upright drills and cutting-off lathes are also being manufactured for various parties.

The Needle Company, at Torrington, is adding another story to its factory, and is also making stairways on the outside.

The Hartford Engineering Co., Hartford, have now 180 men on their pay-roll.

In the Medart pulley department they are turning out from 25 to 30 pulleys per day, and within two weeks will put in additional machinery and a 60-horse-power engine, which, with increased number of hands, will give a capacity of not less than 100 finished pulleys per day.

In the engine department there are orders for 51 engines, averaging 150 horsepower each. Among these orders are one for double engines, 500 horse-power, for the York Manufacturing Co., Saco, Me.; two 150 horse power for the Globe Yarn Mills, Fall River, Mass.; one 75 horse-power for the Union Wadding Co., Pawtucket, R. I.; one 400 horse-power for Peter Adams, Buckland; one 150 horse-power for the Hartford Manila Co., Burnside; a pair of 300 horse-power for the United States Electric Light Co., and several other minor orders.

The Cutlery Company, at Southington, has commenced work.

John Bayliss, manufacturer of the well-known hot-blast tuyere, water tuyere and Little Giant portable forge and bellows, has removed his works from New York City, where he has been in business for over 30 years, to Stamford. This change of base was made in order to increase his facilities for a more extensive manufacture of his tuyeres and forges. He has appointed Brower & Leeds, 81 Murray street, New York, his sole agents, who carry a full stock of his goods.

The Ansonia Brass and Copper Company, Ansonia, will add large buildings to their extensive works, in which to manufacture brass by a new process, consisting of the use of gas in the refining of metals instead of coal, thereby enabling an increase of the product and a better distribution of heat about the metal, at the same time providing for more cleanliness in the manufacture.

One of the new buildings will be 226 feet in length by 40 in width, and the other 180 in length and 80 in width, and a great stack will be erected with a 6-foot flue connecting with the gas building, passing underground a considerable distance. The buildings will be of brick with iron roofs, and 1,000,000 brick will be used in the work.

PENNSYLVANIA.

The Trenton Lock and Hardware Company, of Trenton, stopped work for repairs at their extensive establishment on July 1, and started up on Monday, the 15th. They are bringing out a large line of new goods, and will issue a supplement to their catalogue early in September.

PENNSYLVANIA.

The Newton Machine Tool Works, Philadelphia, have brought out a new gear cutting engine, for cutting spur or bevel gears on wheels from 30 to 60 inches diameter.

The stoppage at the Bechtelsville Furnace is likely to continue several days, and fears are entertained that the furnace will chill before the repairs can be made.

The Monocacy Furnace Company, Berks County, has leased Trimble's iron mine, in

West Whiteland township, Chester County, and is now working it.

It would seem probable that there is an intention to start the Wheatland mill. Workmen have been busy getting the boilers ready for raising steam, and began filling the huge water tank on Tuesday. The force of workmen is not very large at present, but still it looks like a beginning.

The proprietors of the Thorndale Iron Works, Chester county, have stopped work for a while, intending to enlarge their mill and put in new furnaces.

It was thought by many that the large stové foundry of Shantz & Keeley, at Spring City, which was recently destroyed by fire, would not be rebuilt at that place, but it is now stated that Mr. Keeley, the proprietor, has determined to rebuild it, and that work upon it will be commenced immediately. Nearly all of the workmen formerly employed in the works have offered to give one, and others two weeks' work in cleaning away the rubbish of the old building.

Stotter Brothers, of the Mechanics' Boiler Works, Pottstown, received five new orders for large boilers from New York again today. They also received an order from the Philadelphia Bridge Works, of Pottstown (Cofrode & Saylor), for a stack 55 feet high and 42 inches in diameter.

The Parker Glass Works, at Kittanning, will not shut down during the present month and August, if men can be had to keep them running.

Columbia Furnace, at Danville, owned by Grove Bros., averaged about 21 tons of pig metal a day during last month.

The Reading Railroad Rolling Mill, North Reading, which stopped last Saturday a week ago, went into operation again last night. During the stoppage a number of repairs were made. The cylinder of the rail engine was reboiled by a Philadelphia firm, and supplied with a new head; the squeezer and several furnaces were rebuilt, and some new shafting was placed in the mill. All the machinery was thoroughly inspected before the mill was put into operation again. The employees number about 280.

The Wheeler Iron Company's rolling mill resumed operations in the puddling department last week. We understand it is expected that the mill in all its departments will be in full operation in a few days.

The repairs to the rolling mill and nail factory of the E. & G. Brooke Iron Company, of Birdsboro', which were commenced last week, are steadily progressing. The old foundation in the factory is almost removed, the foundation for a nail plate furnace completed, and other work, necessary before the new machinery can be put in place, is being pushed vigorously forward. It is expected that the puddling department of the works will be ready for operation by Monday next.

Business is active in coke at Latrobe. All the works are in full blast, and each of them building additional ovens to increase their supply. One works will have 100 new ovens in blast in the course of a few weeks.

We learn that Mr. W. W. Scranton, lately of the Lackawanna Iron and Coal Company, is about to erect a new steel mill near Scranton. He has been for some time in England and Germany perfecting his plans, and as soon as he obtains his charter will commence building operations. The establishment will be called the Scranton Steel Works.

The new stove works of Stauffer, McKnight & Co., Reading, are rapidly approaching completion, and will soon be ready to be put in operation. The buildings are under roof, and they are being finished in the interior.

The old Warwick mines at St. Mary's are about being reopened by the E. & G. Brooke Iron Company, of Birdsboro', who are getting a great deal of iron ore at present from over this branch railroad, and from the Jones' mines. Smith & Buckley will also resume operations at their mines near St. Mary's.

The Danville Iron and Steel Works produced during the month of June 3399 tons of rails.

The L. B. Flanders Machine Works, Philadelphia, have had all sizes of their portable cylinder boring machines in almost constant use for weeks past. Recently they have bored out cylinders for J. & J. Wister, of Harrisburg; Wm. Neal & Sons, of Bloomsburg; Philadelphia and Reading Coal and Iron Company, at Reading; J. B. Morehead & Sons, of Conshohocken; Pencoyd Iron Works; the steamship Vaderland, of the American Line; and the Corliss valves of the Lochiel Iron Works, at Harrisburg.

</



Is designed to be attached to any Barrel or Cask, thereby converting the same into a temporary Tank, fitted with an effective Pump, and while protecting contents from dirt and waste, the owner has entire control of same, by simply locking the cover. It entirely does away with the labor and waste attendant upon emptying Barrels into any of the numerous Metal Tanks, while securing all the conveniences of the same, at a GREATLY REDUCED COST. The Apparatus can be adjusted in a few moments to a Barrel of any size, and as quickly shifted to another when contents are exhausted, the process of connecting being very simple. It is as compact in form as is consistent with perfect efficiency, and we feel confident that a trial will demonstrate its practical value.

WHO HAS USE FOR IT?

EVERY ONE

Who buys in bulk any of the various kinds of Oils, or in fact any Fluid that can be Pumped?

Every Mill, Factory, or Work-Shop, where Oils or other fluids are used, and every store where such fluids are retailed, will find the "CLIMAX" just what they require.

Send for Circular to

PANCOAST & MAULE,
Nos. 243 & 245 SO. THIRD STREET,
PHILADELPHIA, PA.



NOTICE TO THE TRADE.

There are six patents, domestic and foreign, on

Rubber Window Cleaners.

We own them all, and shall suppress infringements. The genuine cleaner is plainly stamped, "Manufactured by *Perfection Window Cleaners* Co., incorporated July 26, 1878." Has patent hollow handle with P. W. C. Co. cast in face. Our manufacturing facilities are so large that we undersell cheap and worthless infringements. We gladly mail sample cleaners with price lists to wholesale trade. Address,

Perfection Window Cleaner Co.,
167 Madison St., Chicago, Ill.

FOR SALE.—Machinery in Store.

Three 8 in. swing Drill Lathes, 4 ft. bed, hollow spindles.

Two 12 in. swing Hand Lathes, 4½ ft. bed. Putnam Mach. Co.

One 8 x 12 Portable Engine and Boiler.

One 8 x 12 Stationary Engine.

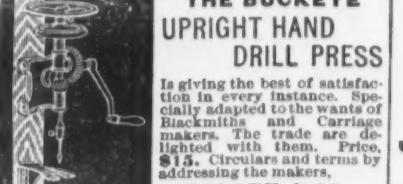
One 8½ x 12 Stationary Engine.

Three 9 x 12 Stationary Engines, link motion, suitable for hoisting purposes.

One Cooper Steam Pump, 8 in. steam, 4 in. water, 14 in. stroke.

Woodworking Machinery. Knowles' Steam Pump, Fan and Cupola Blowers, Exhaust Fans, Centrifugal Pumps, Harrington's Screw Hoists, Emery Goods and manufacturers' supplies. The celebrated Phoenix Steam Engines, 15 to 50 horsepower. Second to none, and 20 per cent. cheaper than any others.

I. H. PRATT, 15 S. Water St., Cleveland, O.



LEIGH'S DISCOUNT BOOK

Acknowledged by all the best work of the kind ever published. Price, by mail, One Dollar.

SPECIAL NOTICE.—This book will be cheerfully sent for examination or comparison to any retail book house representing it, and return postage paid if book is not satisfactory.

Address, E. B. LEIGH, St. Louis Elevator, St. Louis, Mo.



THE GIANT PAD LOCK.
Manufactured by
THE SMITH & EGGE MFG. CO.
(Centennial Award.)

"Superior in Every Respect."

This is one of the best selling Locks in the market, and is made of the best material—very hand-some in appearance, and every Lock is warranted. Orders solicited. Address as above.

Lock Box 1705, Bridgeport, Conn.

THE "DAISY" LAWN MOWER.



We are ready to supply the trade with the

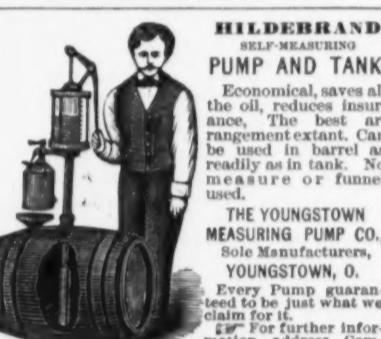
Cheapest and Best Mower now in the Market.

Every machine unconditionally warranted. It has an adjustable vibrating handle, perfectly adapted for Terraces, Slopes and every variety of Lawn.

EVERYBODY CAN AFFORD TO BUY THE "DAISY."

Manufactured in four sizes, for hand use. Liberal discount to the trade.

PAGE, FARGO & CO.,
325 Broadway New York.



HILDEBRAND
SELF-MEASURING
PUMP AND TANK.

Economical, saves all the oil, reduces insurance. The best arrangement ext. Can be used in barrel as readily as in tank. No measure or funnel used.

THE YOUNGSTOWN MEASURING PUMP CO.,
Sole Manufacturers,
YOUNGSTOWN, O.

Every Pump guaranteed to be just what we claim for it. For further information address Company, as above.

FRASSE & CO.,
Importers of
PETER STUBBS' BRIGHT STEEL
WIRE, TOOLS, FILES AND
OTHER METALS.
Send for Price List, P. O. Box 607,
62 Chatham St., N. Y.

THE DUPLEX INJECTOR.

The Best Boiler Feeder Known.

Unequalled for simplicity and always reliable. Does not require adjustment. For varying pressures of steam. Will start when the injector is hot. Less liable to get out of order than a pump. Always delivers water hot to the boiler.

Manufactured and for Sale by

JAMES JENKS,
16 & 18 Atwater St., East,
DETROIT, MICH.

FORGED OX SHOES.

The only Ox Shoe made with patent concavity to fit hoof. Also Flat Shoes with two calks complete, at same price.

Worth double an Malleable Iron Shoe.

Greenfield Tool Co.,
Greenfield, Mass.

been established in Pittsburgh, regarding which the following is of interest: On the 4th of May last the Union Electric Signal Company, of Boston, Mass., removed from that place to Pittsburgh, occupying the large five-story brick building on Garrison alley, formerly occupied by the Bidwell Plow Works. On last Monday the Interlocking Switch and Signal Company, a leading industry at Harrisburg, shipped a large portion of their machinery, together with about 20 mechanics, to this city, and the two companies are now consolidated. The officers of the corporation are: George Westinghouse, Jr., president; Ralph Bagley, vice-president; and Mr. C. H. Jackson, of Harrisburg, general manager. Within the next two weeks all the machinery and appliances of the Harrisburg company will arrive, and the manufacture of railway appliances will begin on a large scale.

The Bradlock Times hears it rumored that a number of coke ovens will be built and put into operation in the west end of the town, and also that a glass factory will be started here in a short time. Mr. Ihmsen, of this city, is said to be the gentleman who will make these additions to the town.

Bryce, Walker & Co., glass manufacturers, are running their new gas furnace, and it promises to give great satisfaction. They will continue on without intermission.

At the State Department, on the 11th inst., a charter was granted to the Pennsylvania Tubing Company, of this city, with a capital of \$800,000. The company, which has been incorporated for the purpose of manufacturing and selling pipe and tubing, is chartered for 50 years. The directors are: Joshua Rhodes, of Allegheny, 7890 shares; J. J. Vandergrift, 7890 shares; J. J. Buchanan, of Oil City, 10 shares; Michael George, of Oil City, 200 shares; Wm. H. Latshaw, of Allegheny, 10 shares. The first president of the company is to be Joshua Rhodes. This gentleman has hitherto owned and operated the Pennsylvania Tube Works, on Hen's Island. He, with the associates mentioned above, recently purchased the old Crescent Tube Works, and these two works have been consolidated under the above charter. The company intend to enlarge and improve their works.

Ripley & Co., glass manufacturers, started up on last Monday morning, and everything is going well. They will continue in operation right along.

OHIO.

The Queen City Malleable Iron Company is the name of a new company just commenced operations in Cincinnati. They have just completed new buildings and machinery, and have introduced some valuable improvements.

In addition to their common malleable iron, which embraces all sizes and shapes known to the trade, they have added a specialty, "welding malleable castings," an article which, without the use of borax or other welding flux, can be welded to steel or wrought iron; or, two pieces of this iron may be welded together and drawn down under the hammer as fine as can be done with the best charcoal wrought iron, showing extraordinary softness and ductility. As will readily be seen by manufacturers of ornamental iron work, surgical and dental instruments, scissors, auger bits and all classes of edge tools, the forging of which enters so largely into the cost and limit of production, this class of castings is just what they want, as it saves a large investment in forging machinery and facilitates the work at reduced cost. The company are prepared to fill orders for their metal, and to make castings from patterns.

At Ironton, the Lawrence Iron Works Co.'s mill and that of the New York and Ohio Iron and Steel Co. are running.

The Brush Electric Company's Works, occupying six acres of ground on Mason street, Cleveland, at the crossing of the Cleveland and Pittsburgh Railroad, are the largest electric works in the world. The buildings first erected, and which consisted of a main machine shop 265 by 122 feet, with proportionate large boiler room, blacksmith shop, japanning oven, carbon factory, tool, carpenter and tin shops, have since had important additions. The machinery used is of the most perfect description. The engine driving it is of 400 horse-power. In the boiler room are three enormous boilers of Otis steel. They were built by the Variety Iron Works and the Cleveland Steam Boiler Works. The carbon department proves one of the most interesting to visitors. Here are furnaces in operation for the burning of the carbons. Provision is made for thirty-six furnaces, each of a capacity of 10,000 carbons, capable of turning out 75,000 carbons per day. The plant for the grinding, mixing, molding, pressing, plating and packing is on a corresponding scale. Three powerful hydraulic presses are in use. Such is the pressure of orders that a new machine shop 410 by 100 feet and an iron foundry 265 by 100 feet are to be added. Some of the material is now on the ground. The buildings are to be of brick and one story in height, thus securing the highest amount of solidity and entire freedom from vibration. With the completion of the buildings they will be capable of affording accommodation for 1500 men, and of turning out from \$8,000,000 to \$10,000,000 worth of work per annum. On a separate piece of land, facing the works, a laboratory has been erected in which Mr. Brush will pursue his investigations. Mr. George W. Stockley is the business manager of the company and Mr. N. S. Possons the superintendent.—*Cleveland Trade Review*.

Disputes from Youngstown are as follows: Brown, Bonnell & Co. are getting ready to build another rolling mill on ground recently purchased from Arms, Bell & Co. and Stambaugh & Arms. The mill will have 30 puddling furnaces, and when completed will give this mammoth corporation 125 puddling furnaces in their mills in this city.

Wellston Furnace will go into blast again in a few days.

The Boyer Elevator Company, Cleveland, have just finished a large hydraulic elevator with a capacity of 2200 pounds, for A. Teachout & Co. The company claim for it a superiority over all other elevators now in use, for simplicity, durability and economy. They are now constructing elevators for several large firms in Buffalo.

The Ohio Grindstone Company, of Cleve-

land, are now operating 13 large quarries of the celebrated Ohio sandstone with a force of about 700 men. The company have recently taken orders for upward of 2000 tons of grindstones, and the entire production of the company is already sold for many months ahead.

The casting house of Howard Furnace was consumed by fire on Friday night. The loss is not large.

The Corns Iron Company, Youngstown, are running their works full time, with trade very satisfactory. At present no new improvements are being added. The furnace for the manufacture of speigleisen, which has been in process of construction near the Eagle Furnace has been started.

The Bolton Steel Company, Canton, are running their works night and day, with a force of about 175 hands.

Sarah Furnace will probably blow out this week, to put in a new hearth, the first since she started some years ago.

The Globe Iron Works, of Cleveland, are running their works night and day with a force of about 175 hands.

ILLINOIS.

The Paris Edge Tool Company, of Paris, Edgar County, is a new enterprise, incorporated last week with the following gentlemen as incorporators: C. V. Lodge, O. S. Jones and Henry Vansell.

The company lately organized in Joliet for the manufacture of Walker's patent locomotive smoke-stacks have selected a site for the manufactory near the Solar stove works, and will build at once.

W. McGregor & Co., of Chicago, manufacturers of general machinery, recently furnished the Forest City Mining Company of Ishpeming, Mich., with a quantity of machinery. They report business good.

The Northwestern Horse Nail Company are experimenting with a gas-heating furnace, for heating the nail rods for their forging machines; also experimenting with two new machines for making nails, capable of doing twice the work of their present machines, and which promises to be a success.

The Eagle Foundry, of Chicago, is the title of a new organization incorporated during the past week, with a capital of \$6000. N. H. Jones, L. B. Fuller and John J. Walsh are incorporators.

The National Boiler Works, of Chicago, will, on the first of September, erect a brick addition 60 x 120 feet to their establishment, and add thereto a quantity of new and improved machinery, consisting of punches, planers, shears, &c., and employ twice the number of hands in their works.

The old blast furnace erected at Joliet in 1872, but never used until the last year, has already proved too small for the business, and the steel company has had a large force of men employed during the month on a new one, which will have all the latest improvements and very much increase the capacity of the works. A part of the pay roll of \$113,000, which was paid Tuesday, was for the workmen on the new blast furnace.—*Chicago Industrial World*.

The old Powell & Douglas pump manufacturing buildings, in Waukegan, which were deserted by this firm for their new quarters two years ago, have been purchased by Mr. Mann, who will proceed to put in new machinery and rebuild the works for the manufacture of agricultural implements.

The Thunder Bay Iron Mining Co., Chicago, was incorporated during the week, with a capital of \$500,000, and the following gentlemen as incorporators: B. H. Jones, E. Hannah, and C. P. Wheeler.

Three new machines have been added to the St. Charles File Works, in which 30 men are employed.

The Globe Iron Works, of Chicago, have just received the contract for the iron work on the new round house, boiler and machine shops of the Pittsburgh Fort Wayne and Chicago Railroad, in this city; also for additional iron work on the new City Hall amounting to \$35,000.

The Superior Barbed Wire Company, of Chicago, was organized the past week with a capital of \$100,000, and the following well-known gentlemen as incorporators: Reuben Ellwood, J. F. Glidden, J. L. Lott, Hiram Ellwood and Isaac L. Ellwood.

MICHIGAN.

The citizens of Waukesha want a furnace located at that point, and offer liberal inducements. There is no better opening on the range for the investment of capital.—*Marquette Mining Journal*.

The following table exhibits, in gross tons, the total lake shipments of iron ore in the present season, up to and including July 13, together with the amount shipped during the corresponding period last year:

	1880.	1881.
Escanaba	442,761	402,259
Marquette	250,172	217,845
L'Anse	15,905	16,370
Total	708,838	727,185

An increase of 18,287 gross tons. Besides these shipments, there were pig iron, ore and quartz shipped as follows:

	PIG IRON.	CARP RIVER IRON CO.'S FURNACES.
Total pig iron.	3,117	

Special Notices.

SECOND-HAND
and NEW TOOLS.

July List No. 1.

The following new and improved Machinists' Tools for future delivery:

3 13 in. sw. 7 1/4 ft. Screw cutting Lathes. July 1.
8 15 in. sw. 6 ft. Screw-cutting Lathe. Sept. 10.
x 16 in. sw. 12 ft. Screw-cutting Lathe. Sept. 1.
x 16 in. sw. 16 ft. Screw-cutting Lathe. Sept. 1.
x 16 in. sw. 6 ft. Screw-cutting Lathe. Aug. 15.
1 Iron Planer to plane 2 ft. long 5 in. wide. Sept. 1.
1 Iron Planer to plane 7 ft. long 26 in. wide. Sept. 1.
20 in. Upright Drills, back-gear. Aug. 10.
20 in. Upright Drills, bk. gd. and self fd. July 10.
3 28 in. Upr. Drills, bk. gd. and self-feed. Sept. 10.
1 Piton Drills, 6" sq. with 5" in. face; has gear-cutting attachment. Second-hand.
x 12 in. sw. 4 ft. bed Ser-cut. Lathe. Second-hand.
x 12 in. sw. 6 ft. bed Ser-cut. Lathe. Second-hand.
4 Foot Lathes, 4 in. to 9 in. swing. Second-hand.
15 Hand Lathes, 7 to 20 in., different lengths. Second-hand.
New 4-Spinde Drill Press.
2 W. H. Edwards' Planer, Second-hand.
1 Pratt & Whitney Cam Cutter, 2 heads; Second-hand.
1 Milling Machine, Lincoln pattern. Second-hand.
Manhattan Arms Co. Millers. Second-hand.
2 Phonix Millers. Second-hand.
1 Face Milling Machine. Second-hand.
1 Screw Head Slotter. Second-hand.
2 Second hand, Profiting Machines.
2 2 ft. x 10 in. Iron Hand Planer. Second-hand.
x 12 in. Shaping Machine, Ohl make. New.
6 in. Shaping Machine, Heavy. Second-hand.
Power Hammer. Second-hand.
Steam Hammer, 11 lb. cylinder. Second-hand.
Jeweler's Power Roller. Second-hand.
2 Boiler Plate Rollers. Second-hand.
Double Acting Presses, for power. Nearly new.
Single Acting Presses, for power. Nearly new.
2 Foot Presses. Nearly new.
2 Bliss & Williams Power Punch. Nearly new.
Medium Power Punching Press. Second-hand.
2 Small Power Punching Presses. Second-hand.
2 Foot Punch with bench. Second-hand.
x Taff's Power Shear, 16" blade. Nearly new.
2 Hand Planers. Second-hand.
2 Paley Polishing Machine. Second-hand.
Horizontal Drilling Lathe, 24 in. swing, 10 ft. bed. Bolt Cutter, common old style. Second-hand.
Straitening Machine, wood bed. Second-hand.
Upright Boring Drill, 4 1/2 in. diam., self-fd.; 2d-hd.
Horizontal " 13 1/2 in. diam. self-fd.; 2d-hd.
Bolt Pointing Machine. Second-hand.
2 Foot Lathes. Second-hand.
Tumbling Barrels. Wood. Second-hand.
Richard's Indicator. Second-hand.
Cranes. Second-hand.
1 8x8 Horizontal Engine. New.
Lot of Forges, Old Lathes, Planer and Lathe Tools, Mandrels, Blacksmith and other Tools, also some Woodworking Machinery.

For sale by

The Geo. Place Machinery Agency,
121 Chambers and 103 Reade Sts.,
NEW YORK.

AUCTION NOTICE.

TRADE SALES.

BISELL & WELLES,
Auctioneers,
83 Chambers and 65 Reade Streets,
NEW YORK.TUESDAY, August 2d,
At 10 o'clock a.m.

Large Sale of Hardware, Housefurnishing Goods, Cutlery, &c.,

Comprising a very large assortment of Hardware, Tinned Ware, Pumps, Table Cutlery, Wooden Ware, &c. Also large line of White Enamelled Ware, 100 doz. Shovels, &c., &c.

TUESDAY and WEDNESDAY, Aug. 16 & 17,
LARGE TRADE SALE OFHardware, Edge Tools, Table Cutlery,
Housefurnishing Goods, 500 lots
Stamped, Tinned and Enam-
eled Ware, &c., &c.

Particulars in future advertisements.

Manufacturers and importers who desire to contribute to this sale will please forward their invi-

tations as early as possible.

For Sale.

A train of rolls, nearly new, consisting of the following pieces for metallic rolling:
One pair 16" pinion bushings.
Two pairs 7 1/2" x 16" round bushings.
One pair double face small pinion, 16" housings.
One pair 16" x 20" chilled planishing rolls.
One pair 16" x 18" chilled grooved rolls; takes from 1 1/2" billet to 7 1/2" round.
Splindles and couplings complete, and all necessary gearing for driving 16" train.
One blast furnace.
One 14-foot driving wheel, 24 in. face, in halves.
For price and particulars apply to

THE BIRMINGHAM IRON FOUNDRY,
Birmingham, Conn.

NOTICE.

Change of Firm and Removal.

The copartnership of King, Briggs & Co. expires by limitation August 1, 1881.

HEZEKIAH KING,
EDWARD P. BRIGGS,
OF Kansas City,
FRANCIS T. WITTE.

FRANCIS T. WITTE will continue the Hardware and Cutlery business of above firm at 121 Chambers St. Messrs. H. King and E. P. Briggs request for their former partner, Mr. T. W. Witte, a continuance of the favors shown to their firm.

HEZEKIAH KING will conduct a commission business and represent a number of English firms at 121 Chambers street.

New York, July 20, 1881.

Household Specialty Wanted.

The advertiser being in position to advertise and sell articles of household convenience very largely, would like exclusive or general agency for one or more articles of general necessity, which can be sold largely and cheaply. Correspondence is invited and full particulars are desired.

Address, C. M. PALMER,
Minneapolis, Minn.NEW MAP OF THE
MENOMINEE IRON RANGE.Scale, 1 in. to mile. Size, 35 x 55.
Mounted on rollers, or on cloth in cases.

Price, \$6.00.

Sent to any part of the United States free of freight.

SILAS CHAPMAN, Milwaukee, Wis.

WANTED—Engagement with an iron manufacturing firm, either as salesman, agent, superintendent of works, or general business manager. References given when required.

Address, E. McMILLIN, Pomeroy, Ohio.

Special Notices.

THE PAINT CREEK
MINING PROPERTIES

Of Kanawha County, West Virginia.

PAINT CREEK MINING CO., 10,000 acres.
(On west side of Paint Creek).
WACOMAH MINING CO., 4,700 acres.
(Adjoining the lands of other Co., but mainly on east side of Paint Creek).

PAINT CREEK RAILROAD CO.

(From mouth of Paint Creek up the same).

All under one management, with same directors and same stockholders holding same ratio of interest in each company.

L. L. CONRAD (of Baltimore), President.

GEO. W. RIGGS (of Washington), Treasurer.

DIRECTORS :

L. L. CONRAD, of Baltimore.

GEO. W. RIGGS, of Washington.

H. H. PARKER, of New York.

S. S. BAGGOT, of Alexandria, Va., President Virginia Midland Railroad.

JAMES F. PATTON, of Union, Monroe Co., W. Va.

W. H. EDWARDS, of Coalburgh, Kanawha, W. Va., Pres't of Kanawha and Ohio Coal Co.

ISAAC N. SMITH, of Charleston, Kanawha Co., W. Va.

OSCAR A. VEAZEY, Engineer,

Paint Creek, Kan. Co., W. Va.

These companies have been organized for the development of the valuable coal lands owned by them. They are now constructing a first-class railway that will prove a great convenience to the miners in the pool above Lock and Dam No. 3, part of the improvements now being constructed by the United States Government on the Kanawha River. This railway will be completed in time to transport the large amount of coal in September, 1881. It crosses the C. & O. R. R. and connects with it, so that shippers will have every facility for river and railway trade. The companies intend to sell the coal to reliable parties, and to ship the coal of their lessees to river and rail upon most favorable terms.

Applications for leases may be made to the President or to any member of the Directors.

More particular information given upon request by mail or otherwise to L. L. Conrad, President, 1 Lexington street, Baltimore, or Isaac N. Smith, Charleston, Kanawha County, W. Va., Solicitor of the companies.

New and Second-Hand

MACHINERY.

One Horizontal Engine, 15 1/2 in. x 30 in. Todd & Rafferty.

One Horizontal Engine, 3 in. x 6 in.

One Beam Corliss Engine, 500 H. P.

Portable Engines from 10 to 25 H. P.

Two Horizontal Return Tub. Boilers, 100 h. p. each.

One Hor. Tubular Boiler, 6 ft x 14 ft, 67 4-in. tubes.

Two Hor. Tub. Boilers, 4 1/2 ft. x 13 1/2 ft., 43 4-in. tubes.

One Locomotive Steel Boiler, 30 h. p.

MACHINISTS' TOOLS.

Twelve Lathes, 22 x 12.

New. Ten Lathes, 18 x 8. New.

One Cameron Pump, No. 2.

One Styles & Parker Foot Press.

One Rock Gas Exhaster, No. 1/2.

One 12 ft. x 10 ft. Pond.

One Upright Drill, 3 ft. Pond.

One Milling Machine, Pratt & Whitney.

One Tapping Machine, 6 in. Saunders' Sons.

One Tapping Machine, 1 1/2 in. Saunders' Sons.

One Hydraulic Press, 8 in. ram.

One 10-ton Hydraulic Press and Pump

One 12-ton Hydraulic Press and Pump

One 15-ton Hydraulic Press and Pump

One 18-ton Hydraulic Press and Pump

One 20-ton Hydraulic Press and Pump

One 25-ton Hydraulic Press and Pump

One 30-ton Hydraulic Press and Pump

One 35-ton Hydraulic Press and Pump

One 40-ton Hydraulic Press and Pump

One 45-ton Hydraulic Press and Pump

One 50-ton Hydraulic Press and Pump

One 55-ton Hydraulic Press and Pump

One 60-ton Hydraulic Press and Pump

One 65-ton Hydraulic Press and Pump

One 70-ton Hydraulic Press and Pump

One 75-ton Hydraulic Press and Pump

One 80-ton Hydraulic Press and Pump

One 85-ton Hydraulic Press and Pump

One 90-ton Hydraulic Press and Pump

One 95-ton Hydraulic Press and Pump

One 100-ton Hydraulic Press and Pump

One 105-ton Hydraulic Press and Pump

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One 210-ton Hydraulic Press and Pump

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One 235-ton Hydraulic Press and Pump

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One 285-ton Hydraulic Press and Pump

One 290-ton Hydraulic Press and Pump

One 295-ton Hydraulic Press and Pump

One 300-ton Hydraulic Press and Pump

One 305-ton Hydraulic Press and Pump

One 310-ton Hydraulic Press and Pump

One 315-ton Hydraulic Press and Pump

One 320-ton Hydraulic Press and Pump

One 325-ton Hydraulic Press and Pump

One 330-ton Hydraulic Press and Pump

One 335-ton Hydraulic Press and Pump

One 340-ton Hydraulic Press and Pump

One 345-ton Hydraulic Press and Pump

One 350-ton Hydraulic Press and Pump

Trade Report.

Office of THE IRON AGE.

WEDNESDAY EVENING, July 20, 1881.

The chief disturbing influence of the week has been the continued cutting of rates by the trunk-line railroads, over which Pool Commissioner Fink seems to have no control whatever, and the demoralizing effects are more or less apparent through the whole line of speculative shares. The bears have not scrupled to avail themselves of the opportunity to depress prices. Under the circumstances, it is considered doubtful whether favorable advices respecting the crops or the important industries of the country could have any effect, for the time being, in checking the antics of professional "scalpers." It is noticeable, however, that the trunk-line shares, the immediate object of attack, are well sustained. Early in the week there was a partial recovery, arising from a reported settlement of differences between the pool line managers, but these proved illusory and there was a partial relapse. The injunction granted by Judge Barnard to restrain the payment of dividends on Western Union Telegraph stock also had an unsettling influence. The Elevated Railroad shares were not affected by the appointment of two receivers for the Manhattan Railroad (Judge Dillon and A. L. Hopkins), but they remained quiet, despite the previous sharp decline. On Monday and Tuesday the bears raided Central New Jersey and Union Pacific, and the lowest prices of the week were recorded on Tuesday afternoon.

United States bonds on Tuesday declined $\frac{1}{2}$ @ $\frac{1}{2}$, following a previous weakness due to the sale of some \$500,000 extended 5 per cents on account of the Indian Trust Funds, which movement at first was misunderstood. Later, government bonds were strong and higher. State bonds were dull, irregular and generally lower. To-day Tennessee 6s, new, declined to $73\frac{1}{2}$ from $75\frac{1}{2}$, and ditto 6s, old, to $73\frac{1}{2}$ from 74. South Carolina 6s, non-fundable, advanced to 9 $\frac{1}{2}$, and Louisiana Consols to 66 $\frac{1}{2}$.

The highest rate paid for loans on call during the week was 4%, and that only on few transactions, the rule being 2 $\frac{1}{2}$ @ 3%.

The posted rates for bankers' sterling were reduced on Tuesday to \$4.84 for 60-day, and \$4.86 for eight; the market is steady. As the week closes, money is easy and promises of declining prices, despite the fact.

The importations of specie and bullion at this port during the week ending July 15 were \$136,574, consisting of \$63,614 in gold and \$72,960 in silver, as against a total of \$166,649 for the week ending July 17 last year. The importations since the 1st of January and since the 1st of August compare as follows with the movement during the corresponding periods last year:

	Since January 1	Aug. 1
Parker's Patent Eagle Box Mills.	\$8,207,748	\$1,908,385
No. 102, Iron Hopper, per doz.	\$9.50	9.00
No. 103, " " "	9.50	9.00
No. 104, " " "	8.50	8.00
Parker's Box, Coffee and Spice Mills.	\$8,999,408	
No. 1, Iron Hopper, per doz.	\$9.50	
No. 2, " " "	8.50	
No. 3, " " "	6.50	
No. 4, " " "	6.00	
Total.	\$29,079,533	\$8,999,408
Gold.	\$8,207,748	\$1,908,385
Silver.	8,674,774	3,091,223
Total.	\$29,079,533	\$8,999,408
Gold.	\$8,207,748	\$1,908,385
Silver.	8,674,774	3,091,223
Total.	\$29,079,533	\$8,999,408
Since August 1		
No. 1, Iron Hopper, per doz.	\$9.50	
No. 2, " " "	8.50	
No. 3, " " "	6.50	
No. 4, " " "	6.00	
Total.	\$29,079,533	\$8,999,408
Gold.	\$8,207,748	\$1,908,385
Silver.	8,674,774	3,091,223
Total.	\$29,079,533	\$8,999,408

The weekly bank statement was favorable, showing a gain of \$4,653,675 in surplus reserve, mainly on account of the gain in specie.

As above noted, stocks have been unsettled during the week by the cutting of rates on the trunk-line roads and unfavorable reports. In regard to the rumored meeting for to-day at the Pool Commissioner's office, Mr. Fink disavowed all knowledge of the matter. Comparing the sales of stocks at the beginning and close of the week, most of those on the list have declined, viz.: Western Union, 1; Northwestern, 3 $\frac{1}{2}$; Northwestern preferred, 3; St. Paul, 13 $\frac{1}{2}$; St. Paul preferred, 4 $\frac{1}{2}$; New Jersey Central, 5 $\frac{1}{2}$; Delaware, Lackawanna and Western, 1 $\frac{1}{2}$; Central Pacific, 5; Ohio Central, 2 $\frac{1}{2}$; Lake Erie and Western, 4; Rock Island, 3 $\frac{1}{2}$; Chicago, Burlington and Quincy, 6 $\frac{1}{2}$; Union Pacific, 2 $\frac{1}{2}$; Michigan Central, 3 $\frac{1}{2}$; Illinois Central, 2 $\frac{1}{2}$; Hannibal and St. Joseph preferred, 2; Morris and Essex, 1 $\frac{1}{2}$; Omaha, 1 $\frac{1}{2}$; Omaha preferred, 2 $\frac{1}{2}$; Denver and Rio Grande, 4 $\frac{1}{2}$.

Government bonds declined $\frac{1}{2}$ @ $\frac{1}{2}$ for the 3 $\frac{1}{2}$ s (extended 5s and 6s), and advanced $\frac{1}{2}$ for the 4s and 4 $\frac{1}{2}$ s. The closing quotations were as follows:

CRANDAL, STONE & CO.

The following is an analysis of the bank totals of this week compared with that of last week:

	July 9.	July 15.	Comparison.
Loans.	\$312,86,800	\$347,744,400	Dec. \$4,112,400
Specie.	77,728,500	81,916,900	Inc. 4,218,400
Legal t'drs.	16,284,300	17,058,700	Inc. 774,400
Tot. reserve.	94,012,800	99,005,600	Inc. 4,992,800
Deposits.	349,843,000	351,499,500	Inc. 1,356,500
Reserve required.	87,460,750	87,709,875	Inc. 339,125
Surplus.	6,595,020	11,005,725	Inc. 4,050,705
Circulation.	19,139,300	19,481,300	Inc. 342,000

MINING STOCKS.

The following were the closing quotations for Mining Stocks:

	Bld.	Asked.
Amie.	6.50	44
Alice.	6.50	...
Alta Mont.	5.40	2.05

American Flag.	14	
Bell Isle.	40	
Beetle.	1.75	
Big Pittsburgh.	2.75	
Bonanza C.	13	15
Buckeye.	8	9
Bull Doan.	1.60	
Bulver.	2.50	3.00
Bodie.	5.625	
Bonanza C.	13	15
Boston C.	40	
Buckeye.	1.85	1.35
Caribou.	2.50	80
Dunderberg.	5	
Dahlonga.	64	70
Dunkin.	1.75	1.85
Endless.	1.75	1.25
Great Eastern.	1.75	1.25
Gold Strike.	2.25	2.50
Goodshaw.	40	43
Granville.	5	6
Hibernia.	63	73
Iron Silver.	2.10	2.15
Lacrosse.	28	29
Lakeview.	1.75	1.35
Little Pitts.	2.30	2.50
Mariposa.	3.00	
Max. Pref.	3.00	
Moose.	95	99
Miner Boy.	75	
Navajo.	70	78
North Stan.	7	11
Rocky.	1.75	1.25
Ori and Mi.	93	93
Red Eleph.	13	16
Rappah'k.	17	19
R. Sun.	2.35	3.40
Robinson.	9.625	
South Hite new.	34	35
San Pedro.	4.25	
Silver Cliff.	4.40	4.55
Storm.	2.50	
Spr. V'al.	2.00	
St. L. No. 1.	1.20	
St. L. No. 4.	1.20	1.30
St. L. 1 and 4.	1.20	1.25
St. L. 2 and 3.	4.25	4.30
Tioga.	5.00	
Tip Top.	5.00	
Tuscarora.	23	

Oil Sets.	25	
Zinc and Tin Oils.	50	
Brass and Copper Oils.	50	
Bill and Letter Files.	25	
Curtain Poles.	25	
Picture Rods.	25	
Lightning Rods.	25	
Baby Carriage Trimmings.	25	

The Norwalk Lock Company, South Norwalk, Conn., and No. 82 Chambers street, New York, have issued an appendix to their catalogue, in which they present illustrations of new goods added to their assortment since the publication of the catalogue referred to. Among the goods shown are several new patterns of Locks and Latches, Genuine Bronze Door Knobs, Bell Pulls, Escutcheons, Sash Fasteners and Lifts, Shutter Hinges, &c., Axle Pulleys (with plain and ornamental face), French Window Catches, Cupboard Turns, Bronze Butts and kindred goods. The appendix covers 125 pages, uniform in size with their catalogue, and is accompanied by a revised price list of 23 pages.

We are informed that the firm of King, Briggs & Company will be dissolved August 1st, and the business of Hardware specialties conducted by them will be continued by Mr. Francis T. Witte, of the old firm, at No. 111 Chambers street. Mr. Hezekiah King will have an office at the same place, where he will be pleased to meet his friends in the trade.

BRITISH IRON MARKET.

LONDON, July 20, 1881.

[Special Report by Cable to *The Iron Age*.] Scotch Pig.—A large business has been done during the week and prices are higher. An advance of 6d. on all brands is reported, to-day's quotation being:

Gartsherrie, alongside, Glasgow. 55/-
Coltness. " " " 55/-
Glenarnock " Ardrossan. 55/-
Eglinton " " " 48/-

Lighterage from Ardrossan to Glasgow is 2/- per ton.

Bessemer Pig.—An active market is reported, under an improved demand, and business has been heavy. Prices are firm. Lots equal portions Nos. 1, 2 and 3 are quoted 57/-, an advance of 1/- on last week's figures:

Manufactured Iron.—The demand is increasing, and transactions have been large. Prices are steady. Best Staffordshire Bars are quoted 2/-.

Steel Rails.—The demand is large and business has been heavy. Prices are firm. We quote ordinary sections, £5. 15/- @ 6/- per ton.

Iron Rails.—There has been a steady demand during the week, and transactions have been large. Welsh are quoted steady at £5 @ 5/- per ton.

Old Rails.—The offerings have been moderate and sales fair. Prices are firmer and higher, Old Tees being now quoted £4. 7/-.

Scrap.—Sales have been small and offerings moderate. Prices are firm. Wrought Scrap is quoted £3. 15/-.

IRON.

American Pig.—The demand for Pig Iron has improved during the week, and although nothing very heavy in the matter of sales is reported, a fair business in small lots, the aggregate of which is considerable, has been done. Sales of 1000 tons, Thomas, in lots at our quotations, are announced, and in other brands we hear of considerable business, the particulars of which are withheld. We quote: Foundry No. 1, £23 @ £24; Foundry No. 2 X, £21 @ £22; Gray Forge, £20.

Scotch Pig.—The tone of the market is firm, and prices, although not quotably higher, are stiffening. Sales during the week have been fair, and the arrivals have all gone into consumption. We quote as before: Eglinton, £20.50; Carnbroe, £22.50; Coltness, £23.50; Glengarnock, £22.50, and Gartsherrie, £23.50. Occasional sales of Middlesbrough Iron are reported, and stocks are declining. No. 3 is quoted £18.50 @ £19.

Rails.—The inquiry for Steel Rails is active, and, for 1882 delivery, some large orders have been placed during the week. We quote Steel at mill, future delivery, £55 @ £56, while for earlier delivery quotations would range from £57 @ £60. For Iron Rails there is considerable inquiry, but no transactions worthy of mention are reported. We quote Iron Rails, £43 @ £49.

Old Rails.—Sales in lots aggregating about 1500 tons are reported. We quote T. & D. H., £26 and D. H., £27 @ £27.50.

Scrap.—Sales are reported of several hundred tons Wrought Scrap, ex store, at about £26. We quote No. 1 Wrought, £27 from store, and for prima selected from yard, £30.

METALS.

Copper.—Little has been done during the week, dealings being confined

Dutch East Indies.

Ptlm., gals. 497,150 60,855

Stettin.

Ptlm., gals. 464,000 38,961

Elsinore.

Ptlm., gals. 118,005 25,597

Christianssand.

Ptlm., gals. 167,018 14,113

Antwerp.

Ag. imp., pkgs. 4 100

Mf. iron, pkgs. 65 690

Ptlm., gals. 144,007 117,536

Sew. ma. cs. 26 300

Hdw. cs. 27 597

Gothenburgh.

Ptlm., gals. 100,775 8,100

Naphl., gals. 53,823 4,106

Fredericia.

Ptlm., gals. 197,053 15,760

Rotterdam.

Pumps, pkgs. 1 133

Mf. iron, pkgs. 40 610

Clocks, bxs. 10 145

Hdw. cs. 1 10

Ptlm., gals. 237,412 18,000

Copper, bars. 49 1,001

Mach'y. pkgs. 7 45

Odesa.

Ptlm., gals. 232,430 27,500

Stockholm.

Ptlm., gals. 281,175 23,542

Bremen.

Naphl., gls. 146,883 14,700

Ptlm., gals. 130,370 20,000

Mf. iron, pkgs. 12 475

Hdw. cs. 25 1,118

Amsterdam.

Clocks, bxs. 3 160

Danish West Indies.

Ptlm., gals. 534,451 35,765

British Possessions

in Africa.

Ptlm., gals. 12,600 2,785

Nails, kegs. 25 1,020

Ag. imp., pkgs. 5 88

Pumps, pkgs. 1 50

Bristol.

Ptlm., gals. 209,292 24,291

Clocks, pkgs. 15 249

Liverpool.

Mf. iron, pkgs. 16 2,167

Sew. ma. cs. 315 5,122

Hdw. pkgs. 72 4,026

Valves, cs. 1 100

Mach'y. pkgs. 91 19,207

Ag. imp., pkgs. 70 1,684

Clocks, pkgs. 345 9,376

Met. g'da. cs. 1 400

French West Indies.

Ag. imp., pkgs. 3 50

Ptlm., gals. 550,000 50,000

Sew. ma. cs. 6 50

Hdw. cs. 1 34

British West Indies.

Ptlm., gals. 16,800 2,134

Mf. iron, pkgs. 30 464

Pt. min. pkgs. 3 88

Clocks, bxs. 10 980

Revolvers. 2 20

Pins. 2 230

Tinware, cs. 3 45

Nails, bxs. 18 47

Hdw. pkgs. 140 1,409

Nails, kegs. 45 1,518

Ag. imp., pkgs. 17 230

Mach'y. pkgs. 22 776

Sew. ma. cs. 13 214

Boiler. 1 460

Pumps, pkgs. 3 3

New Zealand.

Ag. imp., pkgs. 159 50,650

Wire, bxs. 125 4,380

Cette.

Ptlm., gals. 148,918 11,098

Dunkirk.

Ptlm., gals. 197,342 11,238

Cuba.

Mf. iron, pkgs. 182 1,812

Iron plates. 40 336

Socia, pkgs. 34 366

Ag. imp., pkgs. 21 2,120

Tacks, cs. 7 46

Nails, kegs. 215 871

Heaters. 2 643

Pimbrs., mtl., pkgs. 4 108

Pumps, pkgs. 3 64

Lead, pds. 10 40

Mach'y. pkgs. 540 23,441

Hdw. pkgs. 133 3,096

Clocks, cs. 3 70

Lead, box. 1 29

Steel, pkgs. 28 1,671

Iron, bds. 10 80

Copper, coils. 2 30

Nails, cs. 11 98

Ptlm., gals. 10,550 1,232

Fenezuela.

Pumps, pkgs. 1 73

Metal, cs. 3 255

Ptlm., gals. 416 510

Hdw. pkgs. 80 807

Mach'y. pkgs. 80 1,168

Nails, kegs. 2 35

Brazil.

Ptlm., gals. 92,068 11,324

Pltd. ware, pkgs. 21 3,626

Cutlery, cs. 79 3,290

Mach'y. pkgs. 37 9,043

Cotton gins, cs. 30 3,650

Cocks, cs. 33 1,370

Pumps, pkgs. 9 286

Rifles, cse. 1 37

Iron safes. 4 370

Hdw. pkgs. 570 9,043

Mf. iron, pkgs. 142 2,192

Pistols, cs. 4 513

Nails, cs. 1 13

Pumps, pkgs. 3 250

Ag. imp., pkgs. 36 500

Needles, pkgs. 2 21

Argentina Republic.

Hdw. cs. 115 4,541

Ag. imp., pkgs. 204 64,099

Cutlery, pkgs. 65 1,076

Ptlm., gals. 34,000 3,550

Mf. iron, pkgs. 19 724

Sew. ma. cs. 45 470

London.

Mach'y. pkgs. 16 2,975

Hdw., pkgs. 155 4,212

Clocks, pkgs. 157 9,047

Scales, pkgs. 6 651

Bell, cs. 3 130

Plumb. traps, pkgs. 7 102

Mf. iron, pkgs. 33 712

Ag. imp., pkgs. 94 1,086

Sew. ma. cs. 35 7,506

Boiler. 1 3,390

Glasgow.

Quan. Val.

Tin plate, cs. 6 500

Copper, kegs. 1 18

Ox zinc, bds. 100 952

Ag. imp., pkgs. 1 65

Mach'y. pkgs. 2,617 375

Hdw. pkgs. 7 1,209

Sew. ma. cs. 55 3,125

Mf. iron, pkgs. 2 270

Pumps, pkgs. 5 100

Ptlm., gals. 8425 1,063

COAL.

Mr. Frank Gowen, of the Reading Rail-

road, who will start for Europe on Saturday,

has been spending a part of this week in

calling on our local coal agencies, and is

quoted as expressing himself very confi-

dently and favorably respecting the results

of the current coal year. Another authority

in coal matters, recognized as equally good,

Exmouth.

Ptlm., gals. 80,750 12,813

Limerick.

Ptlm., gals. 267,045 23,297

Newry.

Ptlm., gals. 16,524 2,600

Belfast.

Ptlm., gals. 92,450 7,875

Dublin.

Ptlm., gals. 136,920 1,466

Gibraltar.

Ptlm., gals. 185,000 20,530

Wmdmills, cs. 12 500

Rifles, cse. 1 107

Hdw. cs. 2 30

Guns, cse. 1 24

Malta.

Ptlm., gals. 130,000 10,005

British Guiana.

times to move off well." **Metals.**—Leads are sustained at 15.20 @ 15.30. Copper is steady at 65 @ 75. Tin is at 100 @ 104. Spelter is at 15.75 @ 16 marks per kilo. **Coal.**—The transit of Westphalian Coal through Hamburg during the six months has been 223,420 tons, against 159,000 in 1880. We still hear that in the Moselle and Sarre region puddle Pig Iron has from 47 francs been reduced to 46; other Iron unchanged. The Lorraine Iron works have taken no steps yet about the projected Steel works, waiting, as they do, for possible still further improvements in dephosphorization.

(*Breslau Gazette.*)

BRESLAU. July 5, 1881.—**Iron.**—There is an improved feeling in the iron branch in Upper Silesia. The blast furnaces have sold their entire production for the third quarter. Merchant Iron has not receded any further during the past fortnight. The rolling mills are all of them quite busy; they ask better prices and are less inclined to make any concessions. Considering the season the demand is said to be greater than the supply. The Upper Silesian Railroad Co. has agreed to the new freight tariff on Coal, which enables producers to ship it to Berlin and Stettin in 3 marks per ton cheaper than hitherto—by water from here and the government railroad administration has just confirmed this arrangement. The official statistics of Upper Silesia's mineral production in 1880 have just been published, from which it appears that the output has been 1,000,000 tons, and that of Iron Ore 482,541 tons. Of Coke pig 334,810 tons were produced, and of Charcoal ditto 1245 tons.

HOLLAND.

(*Koch & Vletterboom.*)

ROTTERDAM. July 5, 1881.—**Tin.**—Holders ask 54.50 for Bangs and 54.25 for Billiton, but would have to take 52.50 @ 50¢ less if they wanted to sell any.

STATISTICS END OF JUNE.

	1881.	1880.	1879.
BANCA.	Slabs.	Slabs.	Slabs.
Deliveries in June.....	13,599	11,793	15,327
" since Jan. 1.....	75,050	68,390	66,532
Stock on warrants at			
Amsterdam.....	16,589	23,805	27,400
Stock on warrants at			
Rotterdam.....	11,160	11,654	22,319
Total.....	27,740	35,450	40,740
Ready for coming sales 70,167	31,158	40,493	
Afloat.....	12,600	10,300	13,603
Total.....	110,516	76,917	103,812
BILLTON.			
Deliveries in June.....	10,502	14,935	11,108
" since Jan. 1.....	55,480	55,395	47,759
Stock here and in Am-			
sterdam.....	55,834	57,667	63,489

CHILI.

(*Weber & Co.*)

VALPARAISO. May 10, 1881.—**Copper.**—The market opened with much firmness, but, notwithstanding, in spite of the decline in Exchange to 27d., prices have not improved. Now there are less favorable advices from Europe, and finally Copper has given way to \$20.55 on board; even at \$20.25 there has been nobody to buy it on the spot. Sales since April 26, 10,048 quintals at \$20.35 @ 32.5%. **Nicaragua.**—Private cable dispatches from Europe report a few vessels in port here, the therefore has been sustained despite the advancing freight market; toward the close producers even ask more. Sales 260,000 quintals at \$2.45 @ \$1.25 for 95 and 96%. The charters have been 13,600 tons for Europe, and 1900 for the United States; the April shipments have been 15,000 tons to Europe and 400 to the United States, while there remained 1000 tons of 8000 tons for Europe and 1000 for the United States. The arrival of a sufficient number of vessels will keep shipments light, probably, in May and June. **Coal.**—Most of late arrivals had been disposed of afloat at 33 @ 34/ on the coast; the few unsold cargoes arrived brought good prices, the demand being lively. Newcastle Steam sold at 43/; Cardiff ditto, 36/; and Swansea Smelting, 29/6. Available ship room, only 6900 tons. **Exchange** for 90 days' sight on London, 27d. @ 27 1/2.

Dust Explosions.

A report has been presented on the results of some experiments made with samples of dust collected at Seaham colliery, in compliance with the request of the British Home Secretary by Mr. F. A. Abel, F. R. S., President of the Institute of Chemistry and Chemist to the War Department: "The results of the experiments with Seaham and other dusts appear," says Mr. Abel, "to have demonstrated that coal dust in mines not only much promotes and extends explosions in mines, by reason of the rapid inflammability of the finely divided combustible, and of the readiness with which it becomes and remains suspended in air currents, but that it may also be itself readily brought into operation as a fiercely burning agent which will carry flame rapidly as far as its mixture with air extends, and will operate even as an exploding agent, through the medium of a proportion of fire-damp in the air of the mine, the existence of which, in the absence of the dust, would not be attended by any danger. That dust in coal mines, quite apart from any inflammability which it may possess, can operate in a distinct manner as a finely divided solid in determining the ignition of mixtures of only small proportions of fire-damp and air, and consequently in developing explosive effects. That a particular dust in the mine may, therefore, be a source of danger, even though it contains only a small proportion of coal or combustible matter. Although the explosion which may occur through the agency of a non-combustible powder, in the manner described, may be of very mild or feeble character in the first instance, it may be almost at once increased in magnitude and violence by coal dust, which the first ignition will raise and bring into action. The proportion of fire-damp required to bring dust in a mine into operation as a rapidly burning or an exploding agent, even upon a small scale, and with the application of a small source of heat or flame, is below the smallest amount which can be detected in the air of a mine, even by the most experienced observer, with the means at present in use, as has been already demonstrated by the experiments of Mr. Galloway. Indeed, with dusts of highly sensitive or dangerous character, under those conditions, and very possibly with dusts not more so than the least sensitive of the Seaham samples, in the presence of a source of considerable heat and flame, such as a blown-out shot or an overcharged hole would constitute, a small proportion of fire-damp, the possible existence of which in the mine might not be in the least suspected, may serve as the inciting cause to the development of an explosion of coal dust. In the complete absence of fire-damp, coal dust exhibits some tendency to become inflamed when passing a very large lamp flame at a high velocity. If exposed to the action of a large volume of flame, such as is produced by the explosion of finely exposed gunpowder or gun-cotton, it exhibits, in addition, a decided tendency to carry or propagate flame. But, so far as can be determined by experi-

ments on a moderate scale, this tendency is of limited nature, and very different, indeed, from the property of carrying or propagating flame, which even comparatively non-sensitive dusts possess in the presence of a very small quantity of fire-damp. In conclusion, it may be admitted as possible that, with the large volume of flame and the great disturbing effect of a blown-out shot as the initiatory cause of the ignition of dust and its suspension in the surrounding air, such inflammation may, in the complete absence of fire-damp, be propagated to a greater distance than the results of small experiments would warrant one in assuming. But it can scarcely be maintained that the air of a mine in which the coal gives off gas at all can be at any time free from fire-damp; and as the existence of very small and unsuspected quantities of that gas in the air of a mine may suffice to bring about the ready propagation of flame by coal dust, and thus to develop violent explosive effects, it would appear needless to assume that coal dust may, in the entire absence of fire-damp, give rise to explosions, even of only limited character in coal mines, in order to account for casualties which cannot be ascribed to the existence of accumulations or sudden outbursts of fire-damp."

The Ansonia Clock Company's New Buildings.

The new factory of the Ansonia Clock Company in Brooklyn appears to be a better insurance risk than the old one. The ground now occupied by two large and two small buildings is 475 by 200 feet. The entrance is on Eighth avenue, and the works extend from Twelfth to Thirteenth streets and nearly to Ninth avenue. The largest building is the one fronting on Seventh avenue. It is perfectly square, being 200 feet on each side, and four stories in height. It is built of brick, and the mason work is very solid, the walls being about two feet thick. The new building stands exactly upon the site of the one that was burned, but it is only four stories in height, whereas the other factory had five. Fastened to the factory walls, inside the yard, are iron stairways and galleries, broad and substantial, leading to every floor upon each of the four sides of the building, so that if a fire occurred the factory could be emptied within three minutes. Iron shutters have been hung for all the windows, and very costly and complete precautions have been taken to guard against another fire. Upon each floor of the new building—that is, each floor on each side of the factory—there are two lengths of hose, each 100 feet long, which are all the time in position, and can be used at a quarter of a minute's notice. Besides these, there are throughout the different buildings 1500 automatic sprinklers, worked upon the thermostatic principle—that is, that if the temperature in any one place gets above a certain degree of heat, the expansion and contraction of certain metals at once starts the thermostatic machine, and the water is thus automatically released. These are designed for action in case a fire should break out at night when there is no one present to handle the hose; and there are so many of them, and the pressure of the water would be so great, that it would be almost an impossibility for a fire to get any sort of a headway. In addition to these precautions, the factory is covered by a large number of electric alarms as well, which when started not only give the location of the fire and send an alarm to the office, sounding it upon a gong, but also set the sprinklers in motion on whatever floor it may be started in. The wood-finishing building is in the rear of the larger factory. It is also of brick, and built in the same style as the one described. It is five stories in height and 200 feet in length by 50 in breadth. There is an immense amount of delicate woodwork to be used, and it will be in this building where it will be manufactured and prepared. Between these two large buildings is the finishing and varnishing shop, a three-story building, 80 by 50 feet in size, and the foundry building, which, like all other structures, is only one story in height. The wool-finishing, varnishing and foundry buildings are all new, and form a large addition to the building as it formerly existed.

Large Transfer of Property in Tennessee.—One of the most important trades in Southern property in years has just been concluded in Nashville, Tenn. The property of the Tennessee Coal and Railroad Company and Sewanee Furnace Company, covering a large body of land, including 15,000 acres of coal, and also 50 coke ovens, a blast furnace making 100 tons of iron daily, and a standard-gauge railroad of 21 miles, with 7 miles of branches—the cost of the improvements alone approximating \$2,000,000—was bought by a party of New York and Nashville capitalists. The price paid is not named. Mr. Nathaniel Baxter, Jr., president of the First National Bank of Nashville, has accepted the presidency of the company. Among the directors will be John H. Inman, of the firm of Inman, Swan & Co., New York; C. C. Baldwin, president of the Louisville, Nashville and Great Southern Railroad; ex-Governor J. D. Porter, president of the Nashville, Cincinnati and St. Louis Railway; E. W. Cole, president of the East Tennessee, Virginia and Georgia Railroad; C. M. McGhee, vice-president of the same company; Thomas O'Connor, of the firm of Cheerey, O'Connor & Co.; Colonel A. S. Colyer, of Nashville; B. R. Smith, of New York, and James C. Warner, of the Rising Fawn Furnace Company.

The London *Morning Post*, in an editorial, directs attention to an article in the *Quarterly Review* intended to show from statistics that British manufacturers are declining, and that foreigners are competing successfully, even in the English markets, in consequence of the system of free trade. The *Post* concludes as follows: "The *Quarterly Review's* array of facts deserves the most considerate attention of every man having the future prosperity of the country at heart. The United States, under the system of protection described by some of our political economists as suicidal, has paid during sixteen years over £150,000,000 of their debt, and paid £20,000,000 last

year under it. The United States have passed by leaps and bounds into a condition of prosperity which before long will enable them to cancel the enormous debt incurred on account of the civil war. England is by no means in the same hopeful condition. We grant that free trade has done much to benefit the country, but we doubt whether it has not been pressed too far; whether it has not become imperative that some resort to retaliatory duties shall be made in order to show that the advantages we offer to foreign states should be met by equivalent concessions on their part." The London *Times* says that the figures most prominently relied on in the *Quarterly Review's* article are altogether erroneous. The reviewer, it says, overstates the excess of imports over exports by £53,000,000, and it points out the fallacy of regarding the excess of imports as a sign of weakness. Even with an excess of imports amounting to £124,000,000, England is doing no more than getting an income on her investments. When the excess diminishes it is a sign that she is again investing largely abroad.

An Iron Observatory for Boston.

Abisha Miller, president of the Atlantic Iron Works, Boston, with several other gentlemen, have determined upon the erection in that city of an iron observatory, which, it is said, will be the highest structure in the country. The models, plans, &c., have all been completed, and its site partially agreed upon. The structure will be built of the best iron adapted for such a purpose, and its general appearance will be both ornamental and imposing, at the same time combining safety and comfort. The plans, however, have special reference to safety. The foundation will be sufficiently strong to support a structure weighing a thousand times more than will be the weight (260 tons) of the observatory, and the shaft itself will be cruciform in shape, with a "well" 3 1/2 feet square in the center. The shaft will be secured by 16 galvanized guys, or steel-wire cables, each with the strength of 40 tons, the lower ends being anchored 10 feet in the earth, imbedded in stone and cement, and arranged in the form of an octagon.

The shaft will have two opposite angles and a car in each, and each car will be operated by independent engines. It is unnecessary to add that the device for operating the cars will be upon the most improved plan, and the machinery, steel wire cables, &c., connected with the same, will be such as to render an accident impossible.

About half way up the shaft there will be two galleries, in the opposite angles, each capable of accommodating 25 or 30 persons. These galleries will afford pleasure to visitors in various ways. Near the top there will also be two galleries, from which flights of steps will lead to a room 25 feet in diameter, filled with seats, and glasses for making observations, and guide-books will be at hand with which to assist the visitors in studying the country. This room will be large enough to accommodate several hundred people. Above this room there will be a lookout for those who may wish to go still higher. The first landing below, already mentioned, will be about half way up the structure.

The observatory will be 325 feet from the ground and 345 feet above sea level, and, although built upon low spot of ground, it will be 68 feet higher than Bunker Hill Monument (from the sea level) and over 100 feet higher than the cupola of the State House, and also further from the ground than the dome of the Capitol at Washington.

The Missouri Iron Company.—The telegraph reports that the negotiations that have been in progress for the formation of a monster corporation at St. Louis, to include the prominent iron works and coal and ore mines of that vicinity, has been consummated. This consolidation is said to include the Iron Mountain Company, with a capital of \$3,000,000; Pilot Knob Iron Company, capital, \$1,500,000, both iron ore mines and blast furnaces; Grand Tower Manufacturing Company, capital, \$1,000,000; Vulcan Steel Works, capital, \$1,000,000; Chouteau, Harrison & Valle Co., capital \$600,000, and the Jupiter Company, blast furnaces, capital \$400,000. This includes two of the largest and best iron ore mines of the country, the best coal mines near St. Louis, six blast furnaces, a Bessemer works and steel rail mill and an iron rolling mill. The company will be known as the Missouri Iron Company, with a capital of \$10,000,000. It is stated that Charles P. Chouteau or Edwin Harrison, both of whom are very largely interested in the Iron Mountain Company and Vulcan Steel Works, will be president of the new company.

The Central and South American Telegraph Company being confirmed in all its rights and privileges, Mr. James Scrymser, the president, sailed for England in the last steamer to close a contract for 3000 miles of submarine cable, to be laid along the Pacific coast to Callao, there to connect with lines to Vera Cruz and the Argentine Republic.

The turbine wheel relied upon to open the valves of the enlarged Welland Canal locks are a failure, and will probably prevent the use of the canal this season. A previous report was that the gate timbers had been allowed to decay, through neglect of the contractor. For some reason the canal opening is unexpectedly delayed.

The largest grading plow ever constructed for any railroad company in this country will soon be delivered to the Chicago, Milwaukee and St. Paul Company. Its weight is 2500 pounds, the landside and share alone weighing 750 pounds. The mold board is 9 feet long, 26 inches wide and weighs 180 pounds; landside, 6 1/2 inches, and 9 feet long; share, 6 feet long, 15 inches wide and 1/2 inch thick; standard, 3 feet 8 inches long, 18 inches deep and 10 inches thick. The coulter weighs 200 pounds. The clevis is of thickly wrought iron and measures 5 feet in length. The plow is to be drawn by a locomotive running on a temporary track, and is calculated to handle more dirt than 2000

men could. It will be used by the construction forces on the extension of the Dakota and Hastings division of the road.

There is another long halt in the construction of the East River Bridge, for want of materials. We learn from the engineers that nearly all the steel, more than 5000 tons, has been delivered to the rolling mill and more than half, or about 3000 tons, has been rolled into the shapes required. As the bridge now appears there is a gap about midway across the river, where the floor beams are not laid, but enough beams are in position between the towers or on the approaches to completely span the river, if they were joined, 240 out of a total of 731 having been laid. The engineers remark that thus far in the erection of the work all calculations have been verified by the facts. The center span comprises about 45 per cent of the whole superstructure.

Telegrams from Montana four weeks ago reported that Patrick Mulligan, a miner at Butte, was pierced through the body by a drill which fell several hundred feet upon him. He has now recovered. No other man in Montana can say that an 8-pound 2-foot inch drill ever passed through his body, soon after the accident occurred, and when he first knew there was a possibility of saving his life, he expressed the somewhat superstitious belief that if the drill were polished and preserved he would ultimately recover. To gratify his humor, the boys at the mine have every day devoted a little time to the polishing of the drill, and it is now as bright and glistening as a new silver dollar, and Mulligan is well.

stupendous work is being talked of by the Cleveland, Lake Superior and Iron Cliffs companies, of Ontonagon, Mich., which is the sinking of an enormous shaft on the corner forming the union of their different lands, and which, there is not the slightest doubt, according to the local newspapers, is underlaid with an immense ore bed. From this shaft the three companies would hoist their ore, saving the expense of sinking three different shafts on the property of each company. This talked-of shaft, if sunk, will surpass anything of the kind in the iron region of any country.

The New York Connecting Railroad and Warehouse Company has been organized, and \$2,000,000 capital paid in, with the object of taking possession of 150 acres of land on the New Jersey shore, between Bayonne and Greenville, whereon to build warehouses and concentrate railroad traffic so that ships can readily load or discharge. Contracts for building the docks have already been made.

The experiment of running a locomotive without brakes has just been successfully tried by the Delaware, Lackawanna and Western Railroad Company. The locomotive is of ordinary pattern, but has an extra pipe leading from the boiler to the steam chest, by which power can be applied against the piston, checking the engine, and enabling the engine to reverse without "hauling over."

According to a letter from Galveston to the New Orleans *Democrat*, a large portion of the iron intended for the Texas and Pacific Railway has been diverted to New Orleans, owing to the failure of vessels to comply with their charters providing for the unloading of 200 or 300 tons per day, which is rendered impossible, owing to insufficient wharf facilities.

A Franco-American Postal Company has been formed under the auspices of the Société Générale, with a capital of 5,000,000 francs. It has annual subsidies of 250,000 francs each from Canada and Brazil, and will receive a bounty of 500,000 francs under the recent French shipping law. It thus starts with a revenue of 1,000,000 francs.

M. de Saint Mortier, in a recent lecture before a Belgian engineers' society, states that the manufacturers of malleable-iron castings in Belgium use as much as 80 per cent of steel scrap in making them, and claim that it considerably improves their quality.

James S. Carew, of Norwich, Conn., died on Saturday, aged 60 years. He was treasurer of the Hayward Rubber Company and the Ashland Cotton Company, president of the Bacon Arms Company, had been Mayor of the city, and was at the time of his death a member of the Board of Water Commissioners.

The Board of Commissioners of the Cincinnati Industrial Exposition have issued, in a very handsome form, the rules and premium list of the exposition to be held from September 7 to October 6 in that city.

Investigations in Philadelphia thus far are adverse to placing electric telegraph wires in the sewers.

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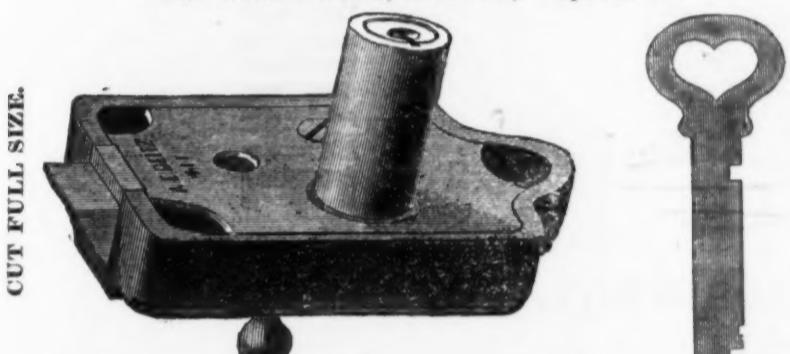
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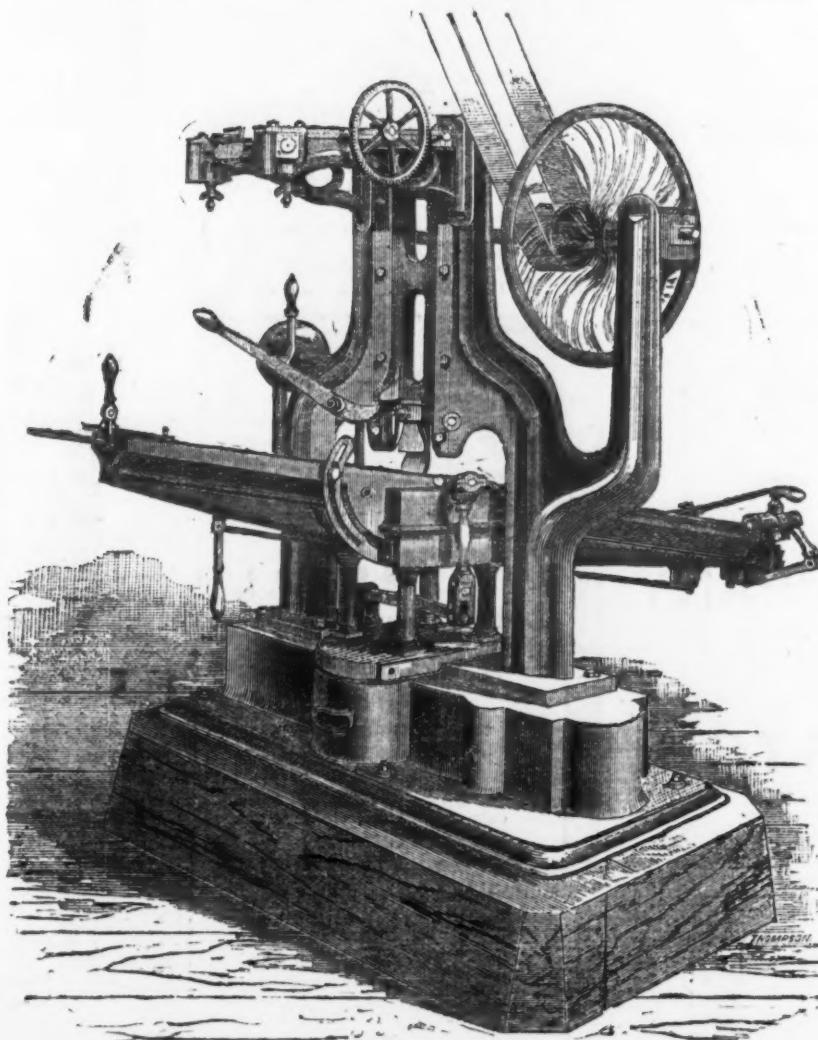
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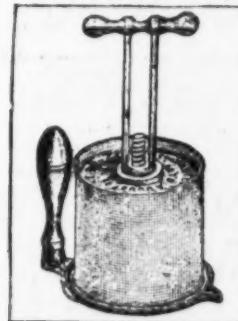


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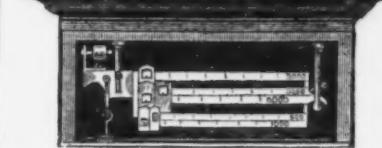
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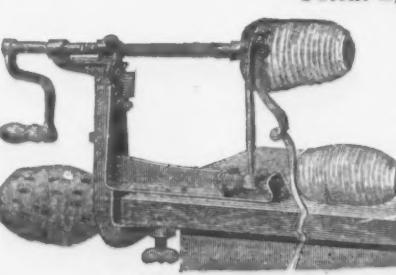
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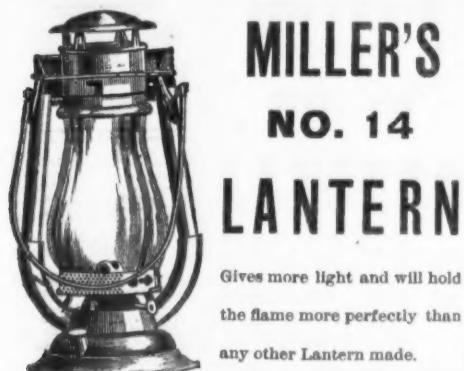
Price to the Trade, \$8 per dozen.

GOODELL CO., Antrim, N. H., Sole Manuf'rs.

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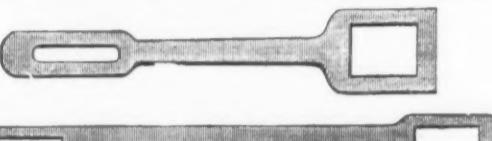
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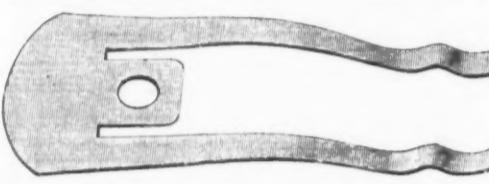
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Of Every Description,
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Albany, N. Y., Dec. 8, 1880.

To All Whom it May Concern:

To-day a decree in my suit against G. T. Fisher & Co., of Detroit, for an infringement of my patent, was made and entered, of which the following is an extract:

At a session of the Circuit Court of the United States for the Eastern District of Michigan, held at Detroit &c., on Wednesday, the 28th day of December, 1880.

Present, Hon. H. B. Brown, District Judge.

NELSON LYON

against *et al.*

It is ordered, adjudged and decreed, that the act entitled "An act for the relief of Nelson Lyon and Jeremiah S. James," passed by Congress and approved April 1, 1880, &c., is a good, valid and constitutional act.

That the original patent, bearing date April 9, 1872, and numbered 128,843, granted and issued to Joseph Bartsaloux, of Paris, France, and assigned to Nelson Lyon when corrected by the Acting Commissioner of Patents, as directed by the said act, was a good and valid patent.

That the said Bartsaloux was the original and first inventor of the improvements in metallic stiffeners for boots and shoe heels mentioned and described in said letters patent.

That the defendants, G. T. Fisher & Co., and each of them, have infringed upon the said patent and upon the said letters patent.

That said Lyon receives of said defendants all the profits, &c., they have made, and in addition thereto all the damage he has suffered by reason of the infringements by the defendants, and also the costs, charges and disbursements in the action.

It is also ordered, adjudged and decreed, that a perpetual injunction be issued against said defendants according to the prayer of the said complainant's bill.

You are also hereby notified that the perpetual injunction has been issued and served on the defendants.

All questions as to damages and settlements in relation to infringements under my patents must be addressed to and made with my attorney, WILLIAM H. KING, in my care at the above address.

NELSON LYON.

Wilson Bohannan,
Manufacturer of Patent
BRASS PAD LOCKS
For Railroad Switches, Freight Cars, and the Hard-
ware Trade. All sizes with Brass and Steel Keys,
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Self-adjusting to doors of any thickness, with Patent Stop and Drawer Back Knob.

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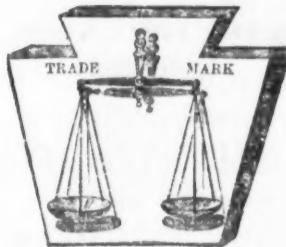
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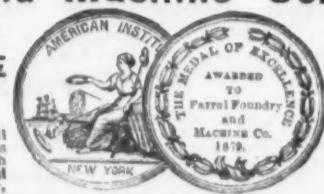
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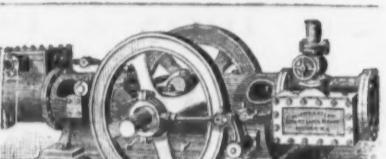


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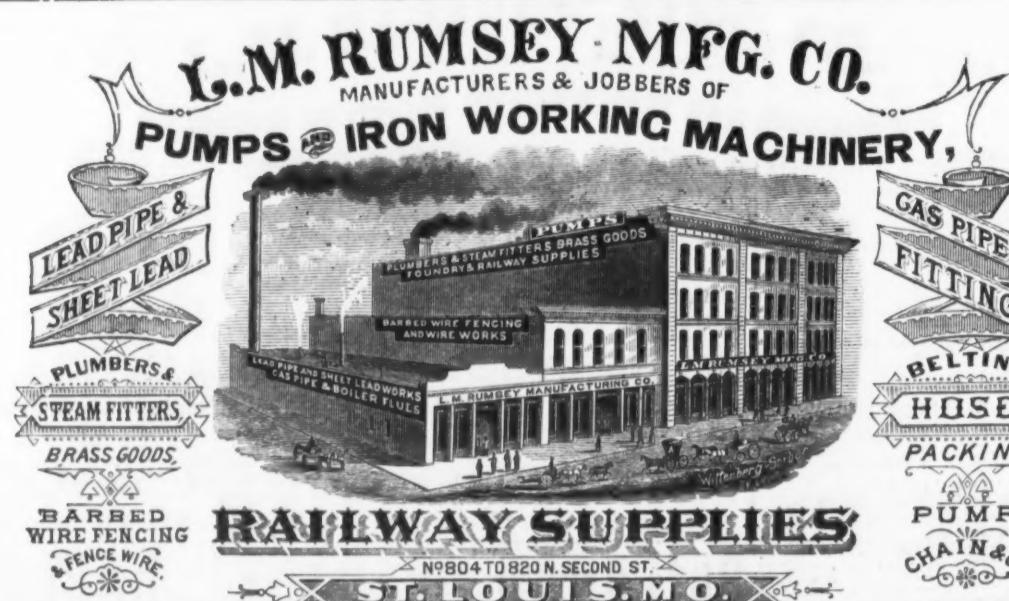
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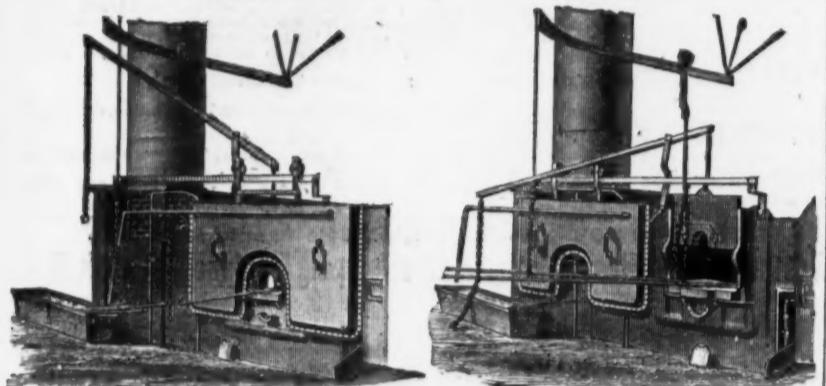
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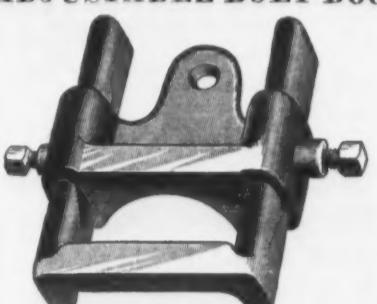
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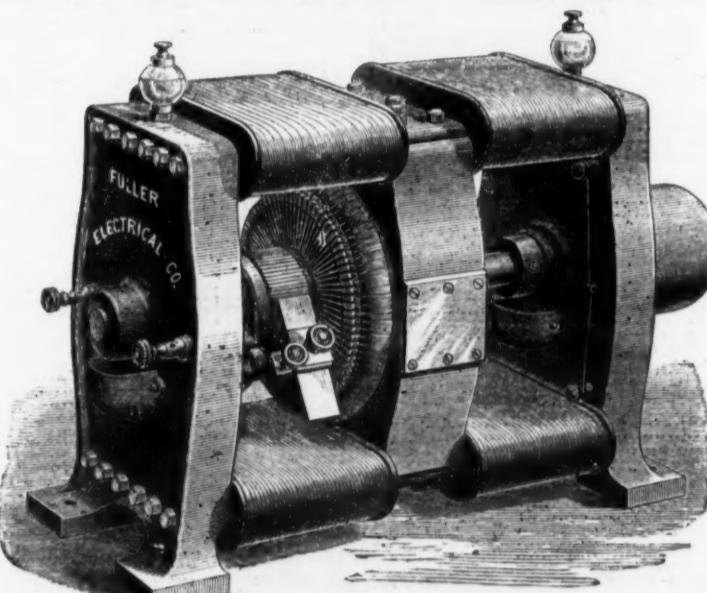
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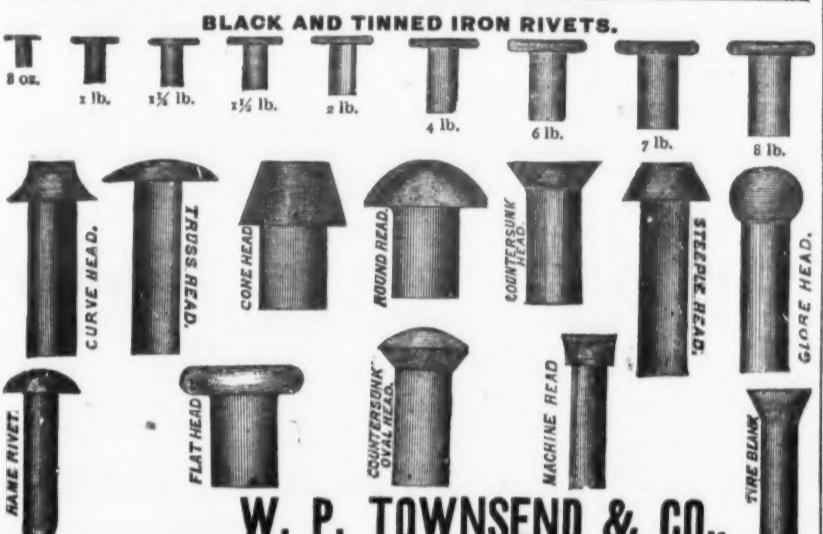
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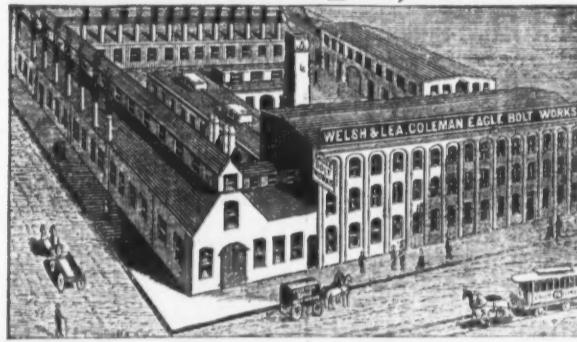
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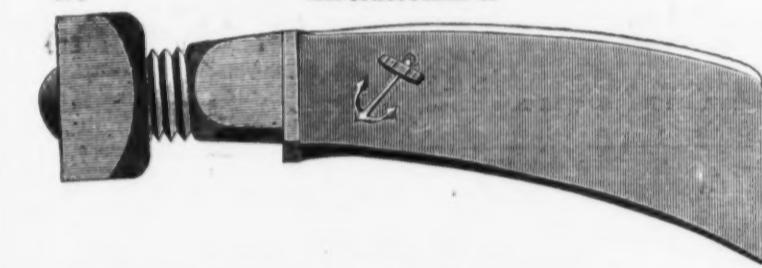
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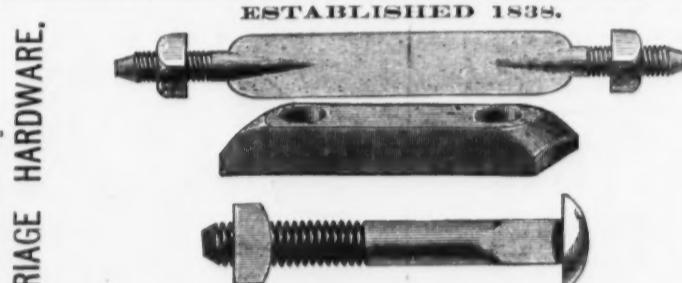
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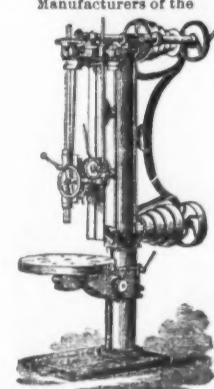
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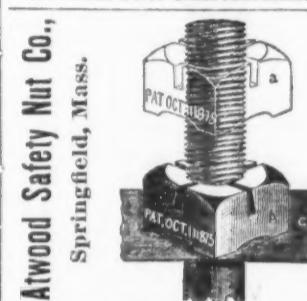
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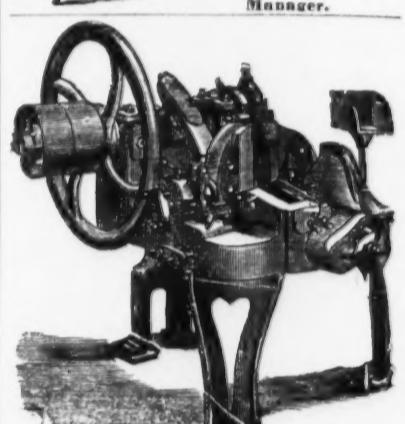
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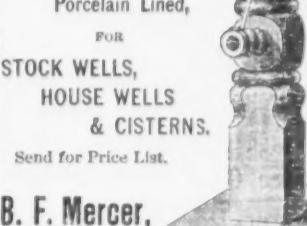
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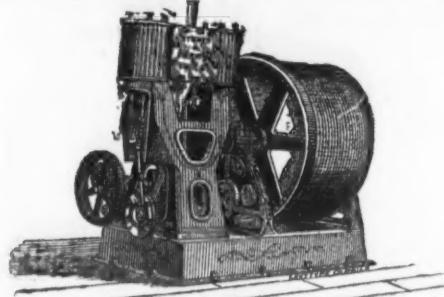


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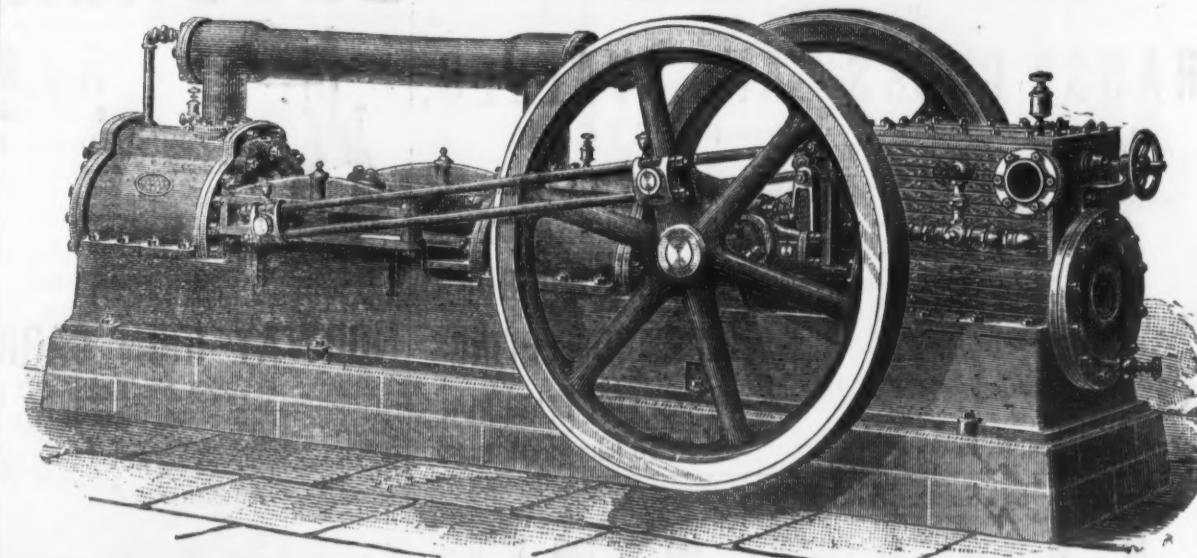
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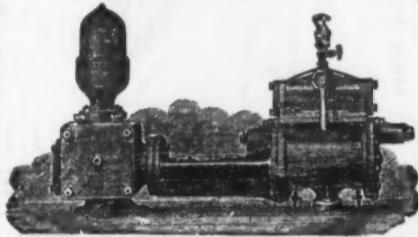
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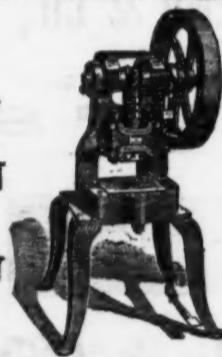
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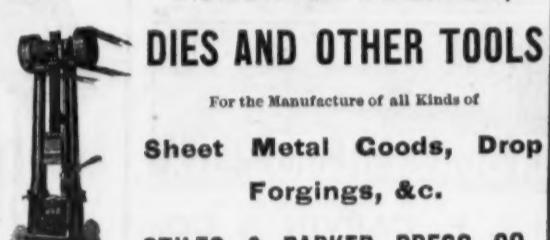
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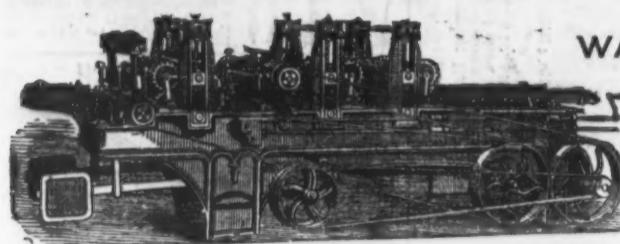
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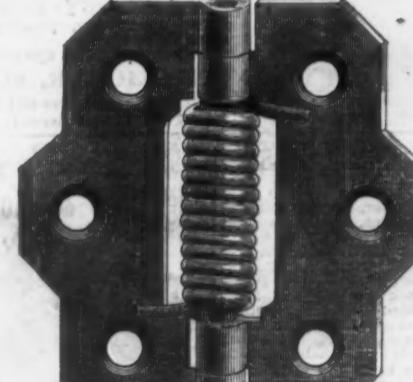
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